YAK 54

Optimized for Precision 3D Aerobatics

Optimized for Precision 3D aerobatics, the Model Tech Yak 54 ARF has enlarged and modified control surfaces to enhance control response at low-airspeed and high-alpha. Wrung out by Model Tech test pilots in months of testing, the Yak 54 ARF has already proven to be a stunning performer. You'll find this Yak 54 ARF is perfectly 3D capable when matched with a YS 110 or Magnum 120 four-stroke and is insanely overpowered with an engine such as the Mark/Moki 1.35 two-stroke. And regardless of the engine chosen, you can find proper balance more easily due to the multiple choices for servo positions and linkages. Exciting, yet well-behaved, this Yak 54 ARF will have you in the air and pushing the envelope like never before.

ASSEMBLY INSTRUCTIONS

Check out our website for more information on other exciting Model Tech products!

HTTP://MODELTECH.GLOBALHOBBY.COM

MODEL TECH®

Model Tech Co., Ltd.
Hong Kong

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FEATURES

- Precision-Built, CAD-Designed Airframe for Light Weight and High Strength
- Laser-Cut, Balsa and Plywood Construction
- Fiberglass Cowl and Wheel Pants
- Aluminium Landing Gear Brackets
- Two-Piece Plug-In Wing Panels with Aluminium Wing Joiner Tube
- Pull-Pull Elevator (or Optional Push-Pull) and Pull-Pull Rudder Control Linkages
- Removable Top Deck Canopy for Easy Radio Compartment Access
- Accepts a Wide Range of Engine Sizes

SPECIFICATIONS

Wing Span: 66.5 Inches (1690mm) • **Wing Area:** 875 Square Inches (56.45dm^2) • **Length:** 65 Inches (1650mm)
Weight RTF: 8.5 to 10 Pounds (3.85 to 4.53kg) • **Wing Loading:** ~23 Ounces/Square Foot (~68gr/dm^2)
Functions: Ailerons, Elevator, Rudder, and Throttle • **Engine Required:** 1.00 to 1.35 Two-Stroke or 1.20 to 1.40 Four-Stroke

Made in China

Kit Product Number MT3173E

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INTRODUCTION

Thank you for purchasing the Model Tech Yak 54 ARF. We're confident that the quality of your new aircraft meets and even exceeds your expectations. Before completing the final assembly of your new aircraft, please carefully read through these assembly instructions in their entirety. Doing so will ensure your success the first time around!

These assembly instructions are designed to guide you through the entire assembly process of your new aircraft in the least amount of time possible. Along the way you'll learn how to properly assemble your new aircraft and also learn tips that will help you in the future. We have listed some of our recommendations below. Please read through them before beginning assembly.

- Please read through each step before beginning assembly. You should find the layout very complete and straightforward. Our goal is to guide you through assembly without any of the headaches and hassles that you might expect.
- There are check boxes next to each procedure. After you complete a procedure, check off the box. This will help prevent you from losing your place.
- Cover your work table with brown paper or a soft cloth, both to protect the table and to protect the parts.
- Keep a couple of small bowls or jars handy to put the small parts in after you open the accessory bags.
- We're all excited to get a new aircraft in the air, but take your time. This will ensure you build a straight, strong and great flying aircraft.
- If you come across this symbol ☞, it means that this is an important point or an assembly hint.

SAFETY WARNING

This R/C aircraft is not a toy! If misused or abused, it can cause serious bodily injury and/or damage to property. Fly only in open areas and preferably at a dedicated R/C flying site. We suggest having a qualified instructor carefully inspect your aircraft before its first flight. Please carefully read and follow all instructions included with this aircraft, your radio control system and any other components purchased separately.

OUR GUARANTEE

Model Tech guarantees this kit to be free from defects in both material and workmanship at the date of purchase. This does not cover any component parts damaged by use, misuse or modification. **In no case shall Model Tech's liability exceed the original cost of the purchased kit.**

In that Model Tech has no control over the final assembly or material used for final assembly, no liability shall be assumed for any damage resulting from the use by the user of the final user-assembled product. By the act of using the final user-assembled product, the user accepts all resulting liability.

OUR RECOMMENDATIONS

This section describes our recommendations to help you in deciding which types of accessories to purchase for your new aircraft.

Please read through this entire section very carefully. We have provided you with recommendations that, if followed, will result in a great flying aircraft. Failure to follow our recommendations may result in a poor flying aircraft.

WHAT GLOW ENGINE SHOULD I USE?

The Yak 54 ARF can be flown using either a 1.00 to 1.35 size two-stroke engine or a 1.20 to 1.40 size four-stroke engine. The aircraft will fly great using either type of engine within the recommended size range, although for the best aerobatic performance, we suggest using an engine at the high end of the suggested size range.

For the best flight performance, we suggest trying to keep the ready-to-fly weight of the aircraft as light as possible. Using an engine that's bigger than recommended will only add extra weight to the aircraft, negating any of the extra power from the larger engine and increasing the wing loading. In most cases, you'll get better flight performance from a lightweight but powerful engine, than from simply a higher displacement engine. **We don't suggest using an engine that's outside of the recommended size range.**

Whether you're going to use a two-stroke engine or a four-stroke engine, the engine will be mounted on its side. If you're using a two-stroke engine, you will need to use an after-market Pitt's style muffler to direct the exhaust out the bottom of the cowl. If you're using a four-stroke engine, the exhaust header on most engines can be rotated down to allow the stock muffler to exit the bottom of the cowl, so no after-market muffler should be necessary.

WHAT RADIO CONTROL SYSTEM AND SERVOS SHOULD I USE?

To get the most out of the aircraft, we suggest using a higher-end digital programmable radio control system, such as the Airtronics RDS8000 FHSS 2.4GHz radio control system or the Futaba 7C FASST 2.4GHz radio control system. Either of these two radio control systems will provide the advanced features that most fliers want for this type of aircraft.

Because of the size of the aircraft and the large control surfaces, you must use high-torque ball bearing servos. For crisp, positive control, we suggest using high-quality, dual ball bearing servos with a minimum of 100oz/in of torque on the ailerons and the elevator halves. We suggest using a high-quality, dual ball bearing servo with a minimum of 150oz/in of torque on the rudder. For throttle control, a standard ball bearing servo can be used. We suggest using Airtronics 94162z servos for the ailerons and the elevator halves, an Airtronics 94358z servo for the rudder, and an Airtronics 94102z servo for the throttle. Both the ailerons and the elevator halves use dual servos*.

*If your radio control system is not capable of mixing the two elevator servos to move the same direction, the use of an electronic servo reverser will be necessary.

WHAT OTHER ITEMS DO I NEED?

There really isn't too much else that you'll need to finish your Yak 54 ARF. You'll need a fueling valve, a 2-3/4" (70mm) aluminium spinner, and propeller and a glow plug to suit your engine. You'll also need typical modeling supplies, such as foam rubber to protect your receiver and battery. White covering material will also be required to seal the aileron and elevator hinge gaps.

HERE'S A LIST OF WHAT WE RECOMMEND TO FINISH THE YAK 54 ARF

QTY. 1	Airtronics RDS8000 FHSS 2.4GHz Radio Control System
QTY. 1	Magnum XL 1.20RFS Four-Stroke Engine
QTY. 4	Airtronics 94162z High-Torque Metal Gear Ball Bearing Servos
QTY. 1	Airtronics 94358z High-Torque Metal Gear Ball Bearing Servo
QTY. 1	Airtronics 94102z Standard Servo
QTY. 4	Airtronics 12" (305mm) Servo Extensions*
QTY. 1	Magnum 2-3/4" (70mm) Aluminium Spinner
QTY. 1	APC 16 x 6 Composite Propeller
QTY. 1	Thunderbolt 4-Cycle Glow Plug
QTY. 1	Magnum Fueling Valve
QTY. 1	Global Silicone Fuel Tubing
QTY. 1	Du-Bro 1/4" Foam Rubber
QTY. 1	Monokote Opaque White Covering Material

*The Yak 54 ARF allows the option of mounting the two elevator servos in the back of the fuselage (if using a heavier engine), or under the cockpit deck (if using a lighter engine). If you mount the elevator servos under the cockpit deck, servo extensions should not be necessary.

TOOLS AND SUPPLIES REQUIRED

- ❑ 5 Minute and 30 Minute Epoxy
- ❑ Thin and Thick Cyanoacrylate (C/A)
- ❑ C/A Debonder
- ❑ Thread Locking Compound
- ❑ Formula 560 Canopy Glue
- ❑ Silicon Sealant
- ❑ # 1 and # 2 Phillips Head Screwdrivers
- ❑ 2.5mm and 3mm Hex Wrenches
- ❑ 5.5mm and 7mm Nut Drivers
- ❑ Wire Cutters
- ❑ Adjustable Wrenches (2)
- ❑ Needle Nose Pliers
- ❑ Modeling Knife
- ❑ Scissors
- ❑ Electric Drill
- ❑ Assorted Drill Bits
- ❑ Straight Edge Ruler
- ❑ Pencil
- ❑ Builder's Triangle
- ❑ 220 Grit Sandpaper
- ❑ Sanding Block
- ❑ Rotary Tool with Cutting Disc and Sanding Drum
- ❑ Masking Tape
- ❑ Airplane Stand
- ❑ Machine Oil or Petroleum Jelly
- ❑ T-Pins
- ❑ Paper Towels
- ❑ Rubbing Alcohol
- ❑ Epoxy Mixing Sticks
- ❑ Epoxy Mixing Cups
- ❑ Heat Gun
- ❑ Heat-Sealing Iron

A NOTE ABOUT COVERING MATERIAL

The covering material used on your aircraft is iron-on, heat-shrink covering material. It is possible with heat and humidity changes that the covering material on your aircraft may wrinkle or sag. This trait is inherent in all types of heat-shrink material. To remove any wrinkles that might be visible you will need to use a heat-sealing covering iron.

❑ Plug in and turn on your heat-sealing iron to the medium-high temperature setting. Allow your heat-sealing iron to heat up for approximately 5~7 minutes.

❑ After your heat-sealing iron has reached temperature, lightly apply your heat-sealing iron to the wrinkled section of the covering material. Move your heat-sealing iron slowly over the wrinkled section until the covering material tightens and the wrinkles disappear.

☞ If the colour layer smears from any of the seams the temperature of your heat-sealing iron is too hot. Turn the temperature dial down and wait about 5 minutes for your heat-sealing iron to adjust to the lower temperature. You can remove any excess colour streaks using a paper towel soaked with a small quantity of acetone.

TIPS FROM THE PROS

- During the covering process, sometimes colour may smear slightly from the seams. If you see any smeared colours on the covering material, they can be quickly removed by simply wiping them off with a paper towel and a small amount of acetone.
- Make sure to test-fit the parts together before applying glue. This will ensure that the parts fit properly before gluing them together.
- When gluing anything that has a smooth surface, it's important to lightly roughen the gluing surfaces with 220 grit sandpaper. This will allow the glue to stick better. Also, never glue directly to the covering material. Always remove the covering material from the gluing surfaces prior to gluing the parts together.
- When cutting away the covering material from the gluing surfaces, be careful to cut only through the covering material. Try not to cut down into the balsa structure because that can compromise the integrity of the airframe.
- We do not suggest storing your aircraft in an extremely hot environment (like the back of your car in direct sunlight) for any length of time. The extreme heat could cause the covering material to wrinkle or sag and possibly damage the fragile components of the radio control system and/or battery.
- Epoxy can be cleaned up before it dries using rubbing alcohol, and C/A can be cleaned up before it dries using C/A Debonder.
- The control surfaces in your kit may be held in place for packaging purposes using temporary cloth hinges. These hinges should be discarded after you remove the control surfaces from the flying surfaces.

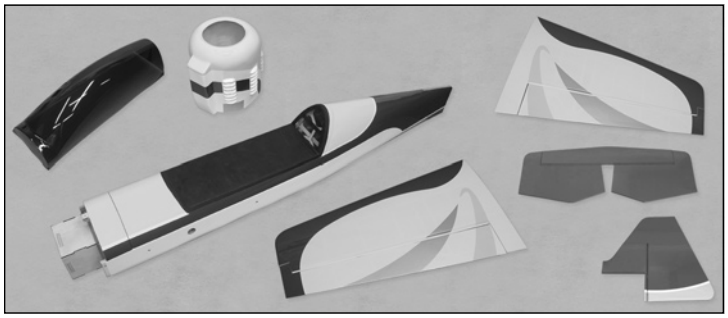
KIT CONTENTS

Before you begin assembly, group the parts as we list them below. This will ensure that you have all of the parts before you begin assembly and it will also help you become familiar with each part.

If you find any parts missing or damaged, please contact your local Model Tech dealer directly, using the separate Customer service sheet included with your kit.

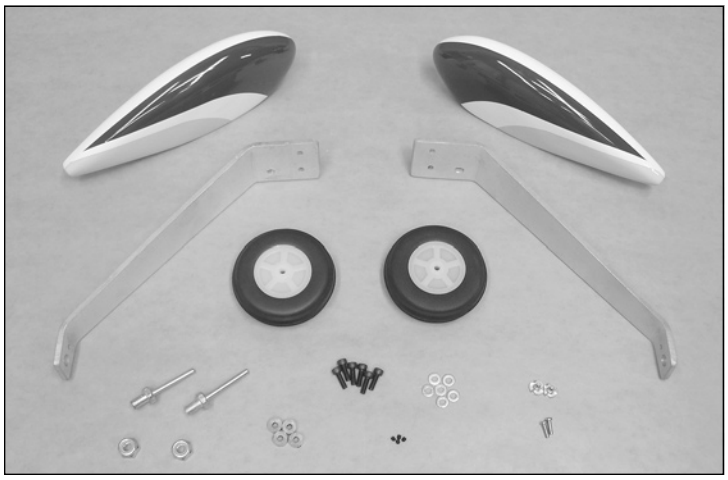
AIRFRAME ASSEMBLIES

- ❑ (1) Fuselage with Cockpit Deck
- ❑ (1) Right Wing Panel with Aileron
- ❑ (1) Left Wing Panel with Aileron
- ❑ (1) Horizontal Stabiliser with Elevator Halves
- ❑ (1) Vertical Stabiliser with Rudder
- ❑ (1) Fiberglass Cowl
- ❑ (1) Tinted Canopy



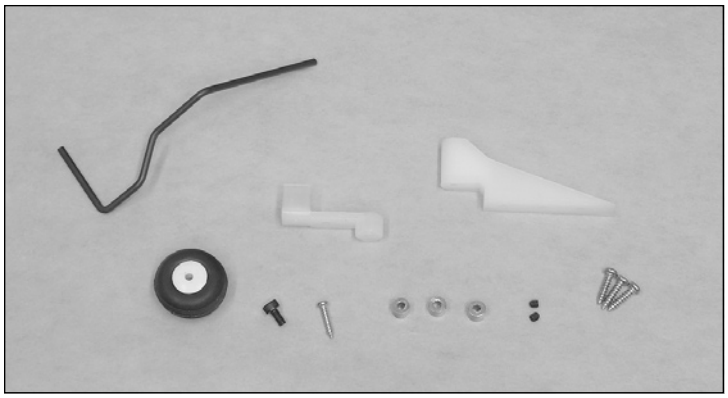
MAIN LANDING GEAR ASSEMBLY

- ❑ (2) Fiberglass Wheel Pants
- ❑ (2) Main Landing Gear Brackets
- ❑ (2) Main Gear Wheels
- ❑ (2) Threaded Axles
- ❑ (2) M8 Lock Nuts
- ❑ (6) M4 x 12mm Socket-Cap Screws
- ❑ (2) M3 x 10mm Machine Screws
- ❑ (6) M4 Flat Washers
- ❑ (2) M3 Blind Nuts
- ❑ (4) Wheel Collars
- ❑ (4) Grub Screws



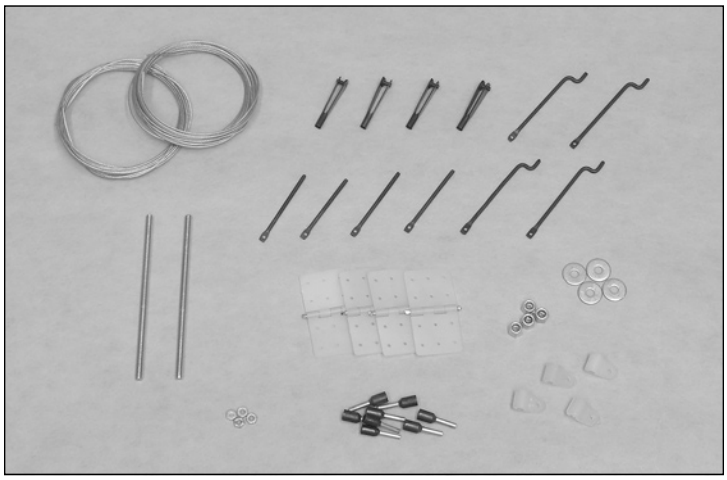
TAIL WHEEL ASSEMBLY

- ❑ (1) Tail Wheel Wire
- ❑ (1) Tail Wheel
- ❑ (1) Nylon Tail Wheel Mounting Bracket
- ❑ (1) Nylon Steering Arm
- ❑ (3) M3 x 12mm Wood Screws
- ❑ (1) M2 x 12mm Wood Screw
- ❑ (3) Wheel Collars
- ❑ (2) Grub Screws
- ❑ (1) M3 x 6mm Socket-Cap Screw



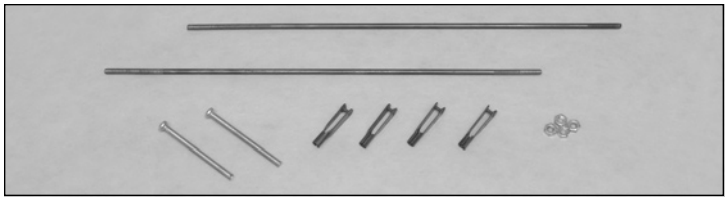
ELEVATOR CONTROL SYSTEM (PULL-PULL OPTION)

- ❑ (2) Stranded Cables
- ❑ (2) M3 x 70mm Threaded Rods
- ❑ (4) Nylon Adjustable Control Horns
- ❑ (4) Threaded Couplers
- ❑ (4) Z-Bend Couplers
- ❑ (4) Metal Clevises - 2mm Thread
- ❑ (8) Crimp Collets
- ❑ (4) M3 Flat Washers
- ❑ (4) M3 Lock Nuts
- ❑ (4) M2 Hex Nuts
- ❑ (4) Pinned Hinges



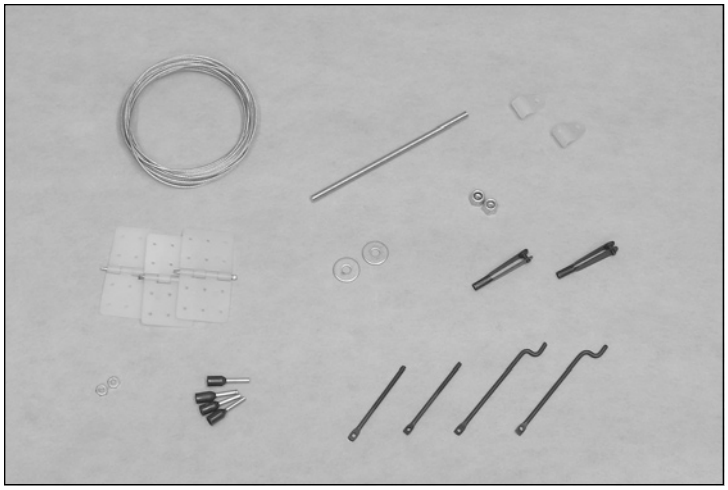
ELEVATOR CONTROL SYSTEM (PUSH-PULL OPTION)

- ❑ (2) 8-1/2" (216mm) Threaded Pushrod Wires
- ❑ (2) M3 x 40mm Machine Screws
- ❑ (4) Metal Clevises - 3mm Thread
- ❑ (4) M3 Hex Nuts



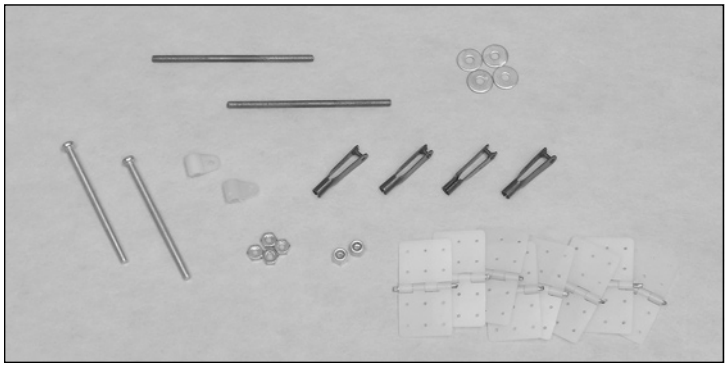
RUDDER CONTROL SYSTEM

- ❑ (1) Stranded Cable
- ❑ (1) M3 x 70mm Threaded Rod
- ❑ (2) Nylon Adjustable Control Horns
- ❑ (2) Threaded Couplers
- ❑ (2) Z-Bend Couplers
- ❑ (2) Metal Clevises - 2mm Thread
- ❑ (4) Crimp Collets
- ❑ (2) M3 Flat Washers
- ❑ (2) M3 Lock Nuts
- ❑ (2) M2 Hex Nuts
- ❑ (3) Pinned Hinges



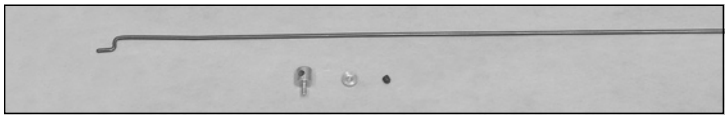
AILERON CONTROL SYSTEM

- ❑ (2) 2-3/8" (60mm) Threaded Pushrod Wires
- ❑ (2) M3 x 50mm Machine Screws
- ❑ (2) Nylon Adjustable Control Horns
- ❑ (4) Metal Clevises - 3mm Thread
- ❑ (4) M3 Flat Washers
- ❑ (2) M3 Lock Nuts
- ❑ (4) M3 Hex Nuts
- ❑ (8) Pinned Hinges



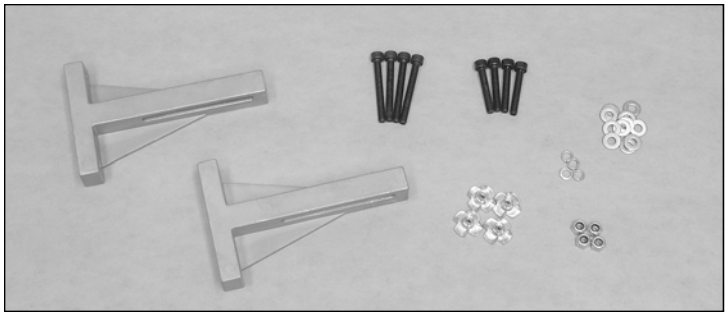
THROTTLE CONTROL SYSTEM

- ❑ (1) 18" (457mm) Pushrod Wire with Z-Bend
- ❑ (1) Adjustable Pushrod Connector with Nut and Grub Screw



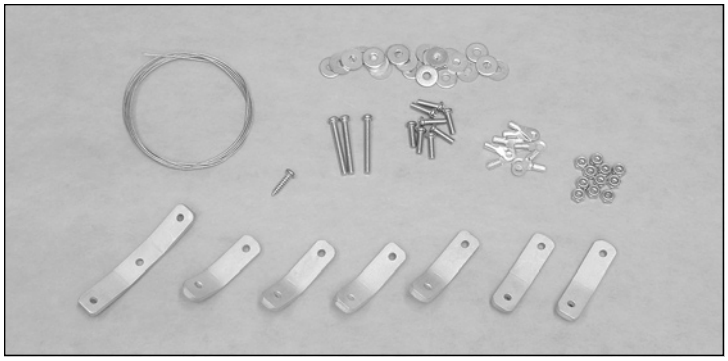
ENGINE MOUNT ASSEMBLY

- ❑ (2) Aluminium Engine Mounting Beams
- ❑ (4) M4 x 35mm Socket-Cap Screws
- ❑ (4) M4 x 25mm Socket-Cap Screws
- ❑ (4) M4 Lock Nuts
- ❑ (4) M4 Blind Nuts
- ❑ (4) M4 Split Washers
- ❑ (12) M4 Flat Washers



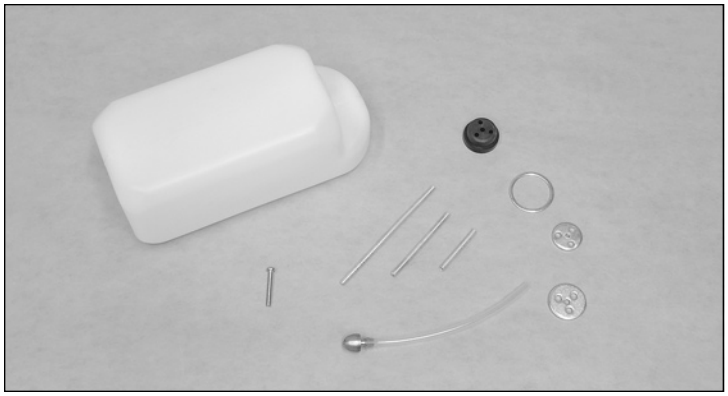
FLYING WIRES

- ❑ (1) Stranded Cable
- ❑ (7) Aluminium Brackets
- ❑ (8) Metal Eyelets
- ❑ (3) M3 x 25mm Machine Screws
- ❑ (8) M3 x 10mm Machine Screws
- ❑ (1) M3 x 12mm Wood Screw
- ❑ (11) M3 Lock Nuts
- ❑ (23) M3 Flat Washers



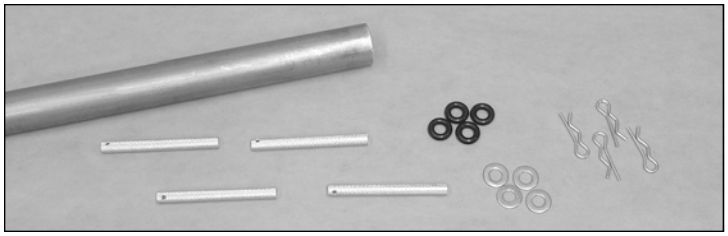
FUEL TANK ASSEMBLY

- ❑ (1) 500cc Fuel Tank
- ❑ (3) Aluminium Tubes
- ❑ (1) Rubber Stopper
- ❑ (1) Metal Plate - Small
- ❑ (1) Metal Plate - Large
- ❑ (1) Fuel Pick-up (Clunk)
- ❑ (1) Silicone Fuel Tubing
- ❑ (1) Metal Support Ring
- ❑ (1) M3 x 20mm Machine Screw



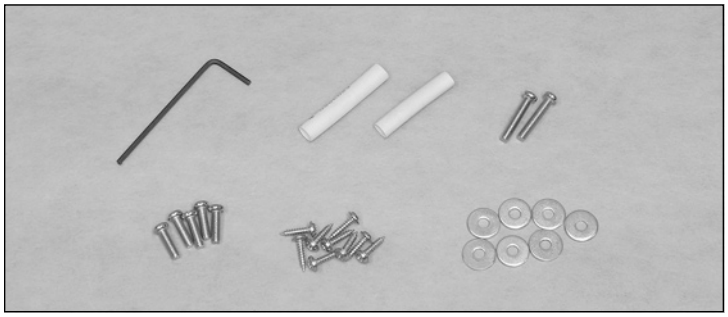
WING MOUNTING ASSEMBLY

- ❑ (1) Wing Joiner Tube
- ❑ (4) Knurled Aluminium Posts
- ❑ (4) Rubber O-Rings
- ❑ (4) M6 Flat Washers
- ❑ (4) Retaining Clips



MISCELLANEOUS PARTS

- ❑ (2) Clear Mock-Up Cowl Halves (Not Pictured)
- ❑ (2) M3 x 16mm Machine Screws
- ❑ (5) M3 x 10mm Machine Screws
- ❑ (7) M3 Flat Washers
- ❑ (9) M2 x 10mm Flange-Head Wood Screws
- ❑ (2) Heat-Shrink Tubing
- ❑ (1) 1.5mm Hex Wrench



REPLACEMENT PARTS

If you need to order replacement parts, we recommend ordering directly from your local hobby retailer. If your hobby retailer does not stock Model Tech products, you can order replacement parts directly from your local distributor, using the Customer Service Information Sheet included with your kit.

Instruction Manual	116350
Fuselage with Cockpit Deck	116351
Wing Panels with Ailerons	116352
Stabilizer Set with Elevator Halves and Rudder	116353
Tinted Canopy	116354
Fiberglass Cowl	116355
Cockpit Deck Only	116356
Fiberglass Wheel Pants	116357
Aluminium Main Landing Gear Brackets	116358
Main Gear Wheels	116359
Tail Wheel Assembly	116360
Hardware Set	116361
Aluminium Engine Mounts	116362
Flying Wires Set	116363
Fuel Tank (500cc)	116364
Wing Joiner Tube	116365
Wing Retaining Clips, Washers, and O-Rings	116366

WING ASSEMBLY

YOU'LL NEED THE FOLLOWING PARTS FROM THE KIT:

- ❑ (1) Right Wing Panel with Aileron
- ❑ (1) Left Wing Panel with Aileron
- ❑ (8) Pinned Hinges

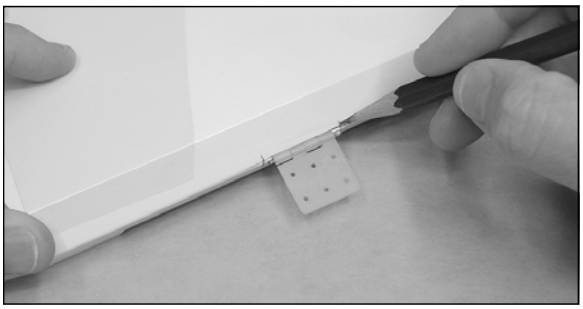
YOU'LL NEED THE FOLLOWING TOOLS AND SUPPLIES:

- ❑ 5 Minute Epoxy
- ❑ Modeling Knife
- ❑ Straight Edge Ruler
- ❑ Pencil
- ❑ Machine Oil or Petroleum Jelly
- ❑ Paper Towels
- ❑ Rubbing Alcohol
- ❑ Epoxy Mixing Sticks
- ❑ Epoxy Mixing Cups
- ❑ Heat-Sealing Iron

STEP 1: HINGING THE AILERONS

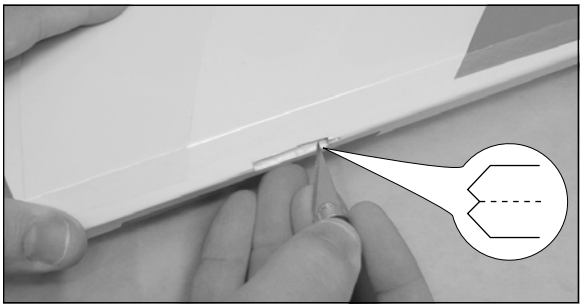
IMPORTANT For flutter-free control surfaces and crisp control response, it is imperative that the hinges be glued in properly. This is achieved by having a tight hinge gap [no more than 1/32" (1mm) wide] and using plenty of epoxy glue. Poor hinge installation can lead to control surface flutter which can result in a catastrophic failure of the airframe.

❑ Remove the aileron from one wing panel and set is aside for now. Discard the temporary hinges that are used for packing.



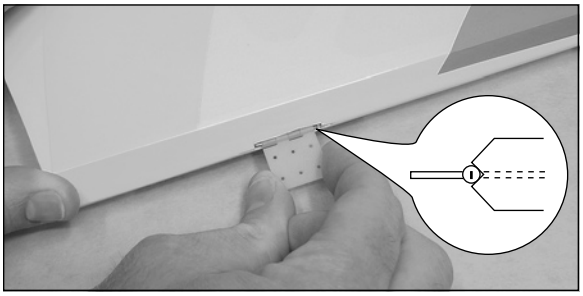
❑ Slide one hinge into each of the four hinge slots in the aileron, making sure that the hinges are centred.

❑ Mark the outside edges of each of the four hinges onto the aileron.



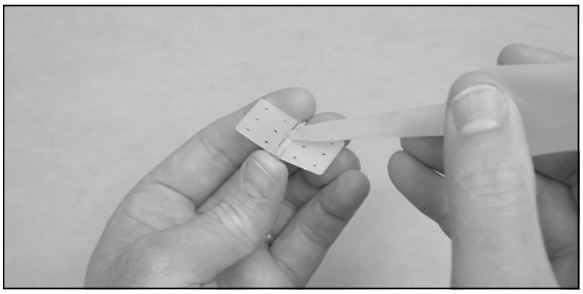
❑ Remove each of the hinges and set them aside for now.

❑ Carefully cut a shallow bevel in the leading edge of the aileron, on both the top and the bottom of each of the hinge slots, to recess the hinge pivot points into.



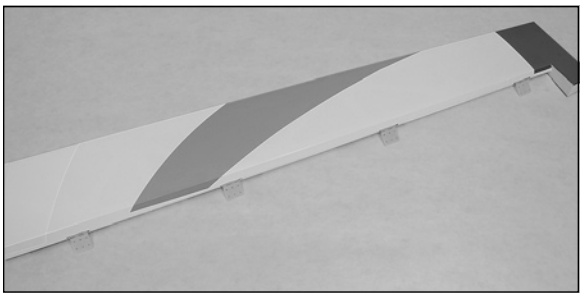
❑ Test-fit each of the hinges into the hinge slots. The hinges should be centred and the centreline of each of the hinge pivot points should be even with the leading edge of the aileron.

IMPORTANT The centreline of each hinge pivot point must be even with the leading edge of the aileron so that the correct hinge gap can be achieved when the aileron is hinged to the wing panel.

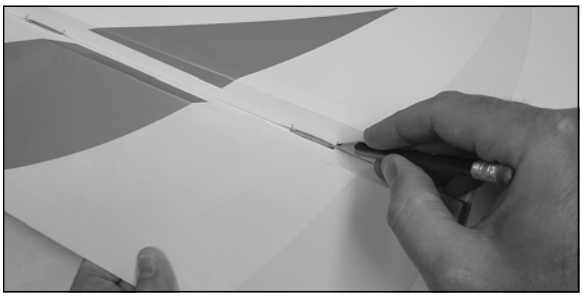


❑ Apply a thin coat of machine oil or petroleum jelly to **only** the pivot point of each of the four hinges.

IMPORTANT The machine oil or petroleum jelly will prevent any excess epoxy from gluing the hinges solid.

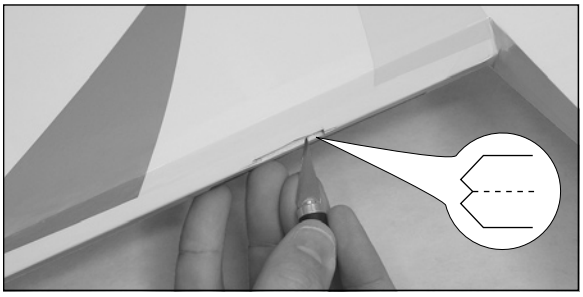


❑ Mix a small quantity of 5 minute epoxy and carefully glue each of the four hinges into **only** the aileron for now. Make sure that each of the hinges is centred and that the centreline of each hinge pivot point is even with the leading edge of the aileron. Remove any excess epoxy, using a paper towel and rubbing alcohol and allow the epoxy to set up before proceeding.



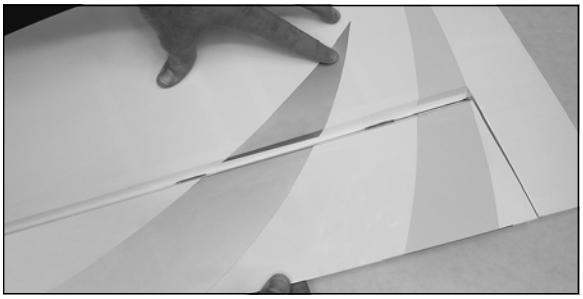
❑ After the epoxy sets up, push the aileron and hinges into the corresponding four hinge slots in the trailing edge of the matching wing panel. Make sure that the tip of the aileron is even with the tip of the wing.

❑ Mark the outside edges of each of the four hinges onto the trailing edge of the wing panel.



❑ Remove the aileron from the wing panel and set it aside for now.

❑ Carefully cut a shallow bevel in the trailing edge of the wing panel, on both the top and the bottom of each of the hinge slots, to recess the hinge pivot points into.



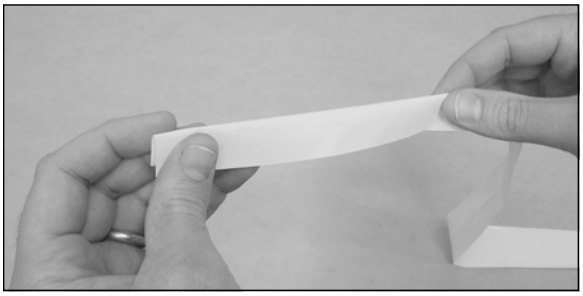
❑ Apply a thin coat of machine oil or petroleum jelly to **only** the pivot point of each of the four hinges, then hinge the aileron to the wing panel, using 5 minute epoxy. Make sure that the leading edge of the aileron is pushed firmly up against the trailing edge of the wing panel. There should be no more than a 1/32" (.7mm) wide hinge gap and the tip of the aileron should be even with the tip of the wing. Remove any excess epoxy, using a paper towel and rubbing alcohol, and allow the epoxy to set up before proceeding.

❑ After the epoxy sets up, pivot the aileron up and down several times to free up the hinges. If there is any excess dried epoxy on any of the hinge pivot points, it can be removed by carefully using the tip of a modeling knife to cut or chip it away.

❑ Repeat the previous procedures to hinge the second aileron to the other wing panel. After the epoxy fully cures, pull gently on both ailerons to ensure that the hinges hold securely.

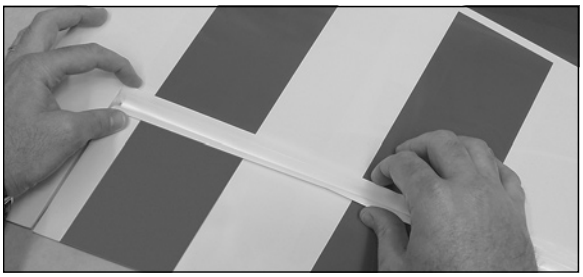
STEP 2: SEALING THE AILERON HINGE GAPS

IMPORTANT It is imperative that the aileron hinge gaps be sealed. Failure to do this can lead to control surface flutter, which can cause your aircraft to crash. Sealing the hinge gaps will also provide crisper control response and allow the aircraft to track straighter and fly truer, making flight trimming easier and more accurate.



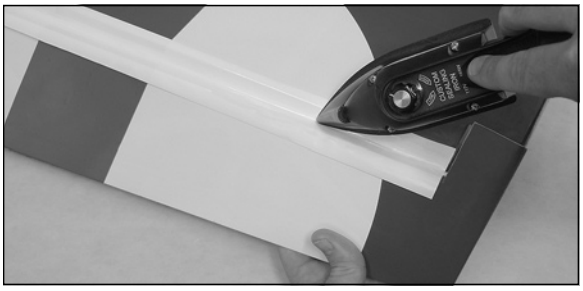
❑ Cut a piece of white covering material (not included) 1-1/2" (38mm) wide and 25-5/8" (650mm) long.

❑ Fold the length of covering material in half lengthwise so that there is a sharp crease down the middle of the covering material.



❑ Remove the protective backing from the covering material. With the control surface fully deflected in the 'UP' position, place the length of covering material over the hinge line (on the bottom), making sure that the crease is pushed completely down into the hinge line.

IMPORTANT Only the bottom of the hinge gap needs to be sealed. It is not necessary to seal both the bottom and the top.



❑ With the control surface fully deflected in the 'UP' position, use a heat-sealing iron to adhere the covering material to both the trailing edge of the wing panel and to the leading edge bevel of the aileron.

❑ Trim the excess covering material flush with both surfaces, then pivot the aileron up and down several times to check for free movement.

❑ Repeat the previous procedures to seal the aileron hinge gap on the second wing panel. Both ailerons should be able to smoothly pivot completely up and completely down without interference from the covering material.

WING MOUNTING

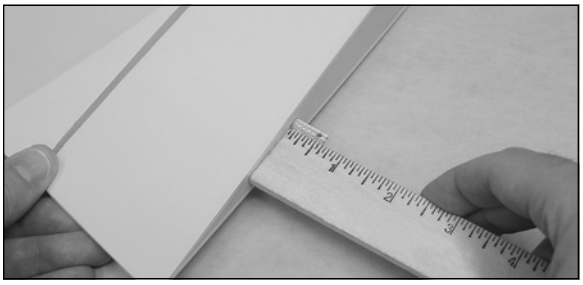
YOU'LL NEED THE FOLLOWING PARTS FROM THE KIT:

- ❑ (1) Fuselage with Cockpit Deck
- ❑ (1) Wing Joiner Tube
- ❑ (4) Knurled Aluminium Posts
- ❑ (4) Rubber O-Rings
- ❑ (4) M6 Flat Washers
- ❑ (4) Retaining Clips

YOU'LL NEED THE FOLLOWING TOOLS AND SUPPLIES:

- ❑ 30 Minute Epoxy
- ❑ Needle Nose Pliers
- ❑ Modeling Knife
- ❑ Straight Edge Ruler
- ❑ Paper Towels
- ❑ Rubbing Alcohol
- ❑ Epoxy Mixing Sticks
- ❑ Epoxy Mixing Cups

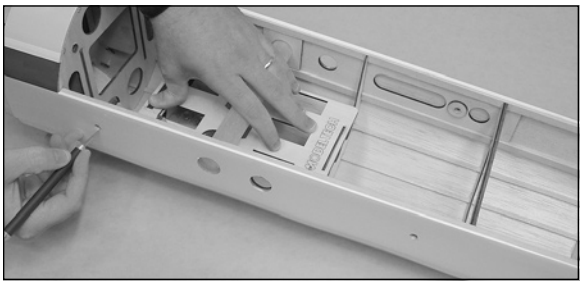
STEP 1: INSTALLING THE WING MOUNTING POSTS



❑ Test-fit and glue two aluminium wing mounting posts into each wing panel, using 30 minute epoxy. When aligned properly, the hole in each wing mounting post should be 1/2" (13mm) out from the root ribs and each hole should be aligned straight up and down to make it easier to install the retaining clips. Make sure to remove any excess epoxy using a paper towel and rubbing alcohol.

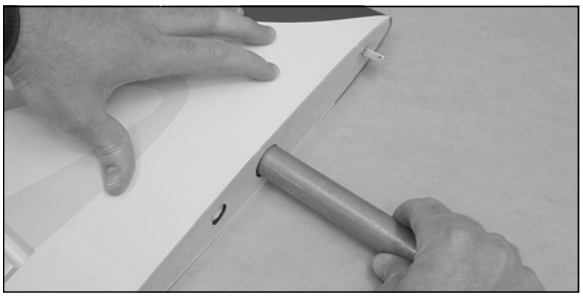
IMPORTANT Make sure that you measure to the centre of the hole in each wing mounting post and **not** to the end of each wing mounting post.

STEP 2: INSTALLING THE WING JOINER TUBE



❑ Remove the cockpit deck from the fuselage and set it aside for now.

❑ Cut away the covering material from over the wing mounting holes and the aileron servo wire access hole in each side of the fuselage.



❑ Gently slide the wing joiner tube into the left wing panel until the wing joiner tube bottoms out.

STEP 3: INSTALLING THE WING PANELS AND RETAINING CLIPS

❑ Carefully slide the other end of the wing joiner tube through the fuselage and firmly push the wing panel up against the fuselage side.

❑ Slide one rubber O-Ring over each of the two wing mounting posts, followed by one M6 flat washer.

❑ While holding the wing panel firmly up against the fuselage side, install one retaining clip through the hole in each of the two wing mounting posts.

PRO TIP Use a pair of needle nose pliers to make it easier to install and remove the retaining clips.

❑ Slide the right wing panel onto the wing joiner tube and push it firmly up against the side of the fuselage.

❑ Repeat the previous procedures to install the two rubber O-Rings, two M6 flat washers and two retaining clips to secure the wing panel into place.

STABILISER INSTALLATION

YOU'LL NEED THE FOLLOWING PARTS FROM THE KIT:

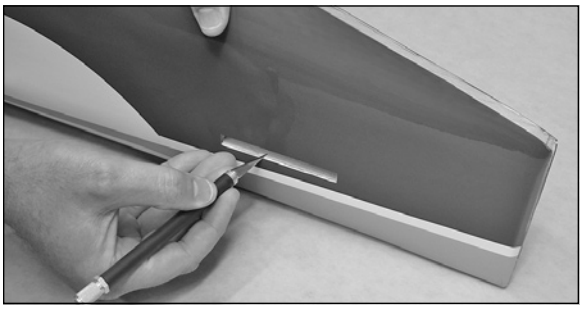
- ❑ (1) Horizontal Stabiliser with Elevator Halves
- ❑ (1) Vertical Stabiliser with Rudder
- ❑ (7) Pinned Hinges

YOU'LL NEED THE FOLLOWING TOOLS AND SUPPLIES:

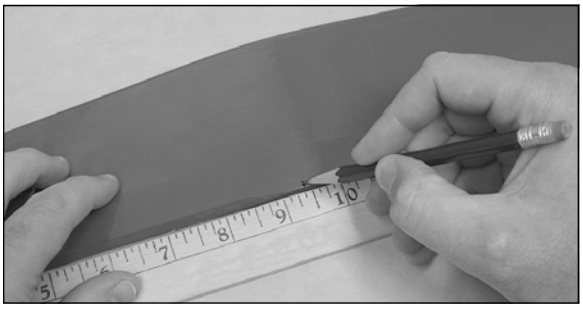
- ❑ 5 Minute and 30 Minute Epoxy
- ❑ Modeling Knife
- ❑ Straight Edge Ruler
- ❑ Pencil
- ❑ 220 Grit Sandpaper
- ❑ Masking Tape
- ❑ Airplane Stand
- ❑ Machine Oil or Petroleum Jelly
- ❑ T-Pins
- ❑ Paper Towels
- ❑ Rubbing Alcohol
- ❑ Epoxy Mixing Sticks
- ❑ Epoxy Mixing Cups
- ❑ Heat-Sealing Iron

STEP 1: ALIGNING THE HORIZONTAL STABILISER

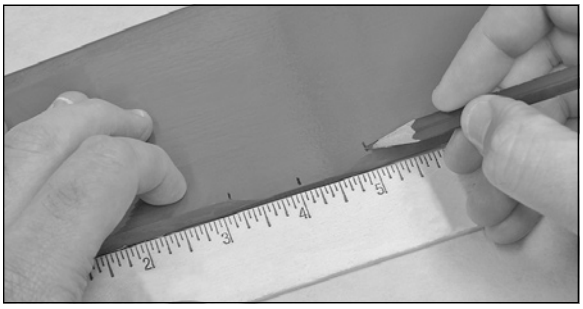
❑ Remove the elevator halves from the stabiliser and set them aside for now. Discard the temporary hinges that are used for packing.



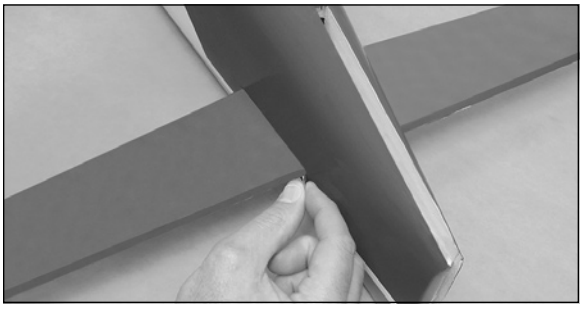
❑ Cut away the covering material from over each side of the horizontal stabiliser mounting slot in the fuselage. The stabiliser mounting slot is 5/16" (8mm) tall and 3" (76mm) long. The front of stabiliser mounting slot is 7-3/8" (187mm) in front of the back of the fuselage.



❑ Measure and draw a centreline mark on the trailing edge of the stabiliser.



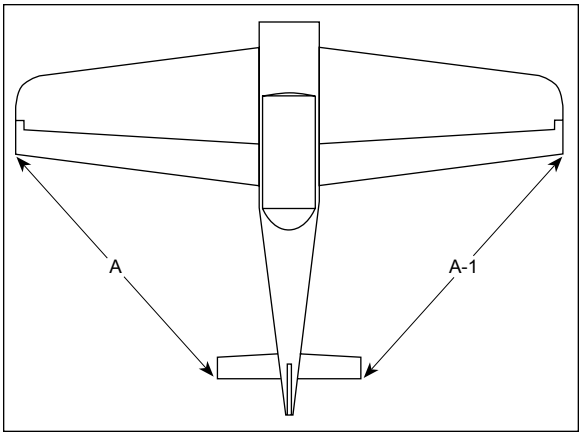
❑ Measure out 7/8" (22mm) from each side of the centreline mark and draw two marks. You will use these two outer marks to centre the trailing edge of the stabiliser with the fuselage.



❑ Slide the stabiliser into the mounting slot and temporarily align the two outer marks you drew previously with the sides of the fuselage.

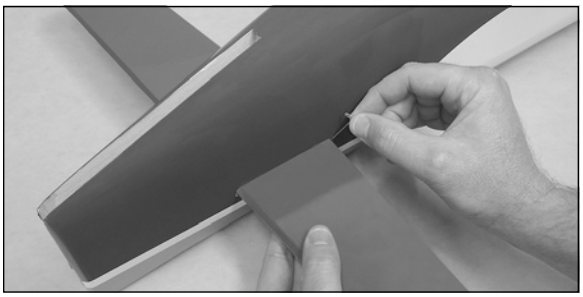
❑ When satisfied with the alignment, hold **only** the trailing edge of the stabiliser in position using a T-Pin.

IMPORTANT The front of the stabiliser should be able to pivot slightly from side to side and the back should stay firmly in place and aligned. The trailing edge should not be allowed to move from side to side.

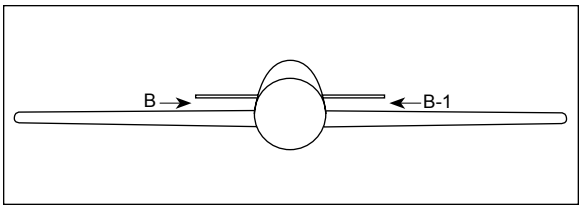


❑ With the wing panels installed, use a straight edge ruler to measure the distance between the tips of the stabiliser and the tips of the wing. Pivot the front of the stabiliser until both of these measurements are equal.

☞ When both of these measurements are equal, you're assured that the stabiliser is square to the wing.



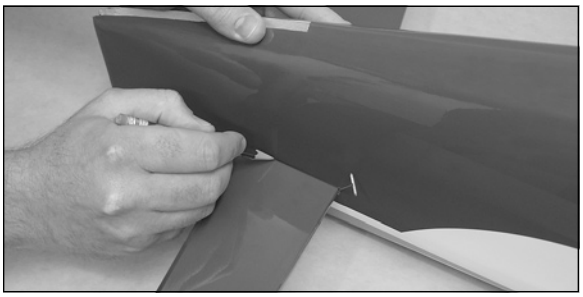
❑ When you're satisfied that the stabiliser is square to the wing, use a T-Pin to hold the front of the stabiliser firmly in place and aligned.



❑ Look from the front of the aircraft at both the wing and the stabiliser. When aligned properly, the stabiliser should be parallel to the wing.

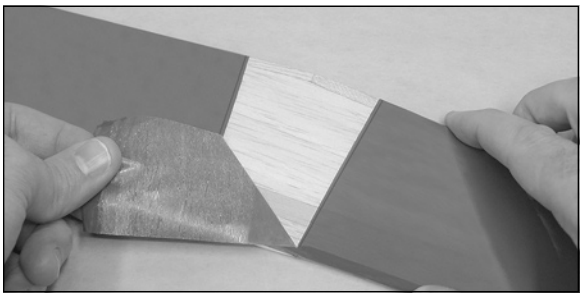
☞ If the stabiliser is not parallel to the wing, remove the stabiliser and sand down the higher side of the stabiliser mounting slot until you're satisfied with the alignment.

STEP 2: INSTALLING THE HORIZONTAL STABILISER



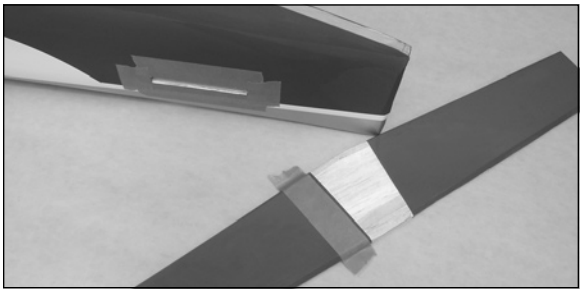
❑ When satisfied with the alignment, draw a line on each side of the stabiliser where it meets the fuselage sides. Do this on both the top and the bottom.

WARNING When cutting through the covering material to remove it in the next procedure, cut with only enough pressure to cut through only the covering material itself. Cutting down into the balsa structure could weaken the stabiliser and cause it to fail during flight.



❑ Remove the stabiliser from the fuselage, then carefully cut away the covering material from inside the lines you drew.

PRO TIP Use a heat-sealing iron to adhere the covering material down where you cut it. This will prevent it from loosening up and wrinkling.



❑ To make it less messy during installation, apply masking tape to the fuselage around the side of the mounting slot that the stabiliser will slide into and to the top and bottom of the corresponding side of the stabiliser, too.

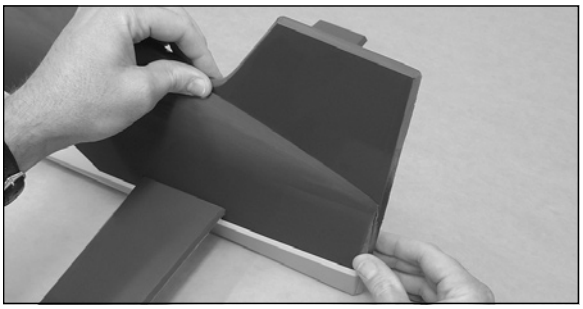
IMPORTANT Because the stabiliser has to slide into place through the fuselage, apply epoxy only to the stabiliser. This will prevent the epoxy from spreading over the entire length of one half of the stabiliser when you slide it into place.

❑ Apply a generous amount of 30 minute epoxy to **ONLY the top and bottom** gluing surfaces of the stabiliser, then push the stabiliser into place and realign it, double-checking all of your measurements once more before the epoxy sets up. Quickly remove any excess epoxy and use T-Pins to hold the stabiliser in place and aligned until the epoxy has fully cured.

❑ After the epoxy has fully cured, remove the T-Pins and masking tape and look closely at the glue joint. If there are any gaps between the stabiliser and the fuselage, fill them using 30 minute epoxy for added strength.

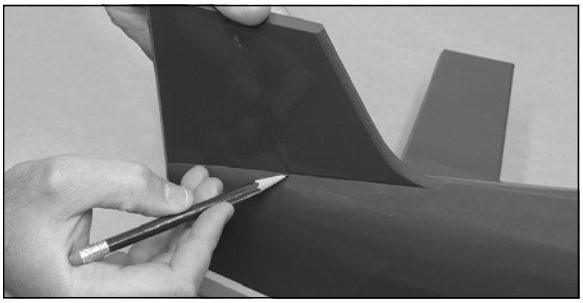
STEP 3: ALIGNING AND INSTALLING THE VERTICAL STABILISER

❑ Remove the rudder from the stabiliser and set it aside for now. Discard the temporary hinges that are used for packing.

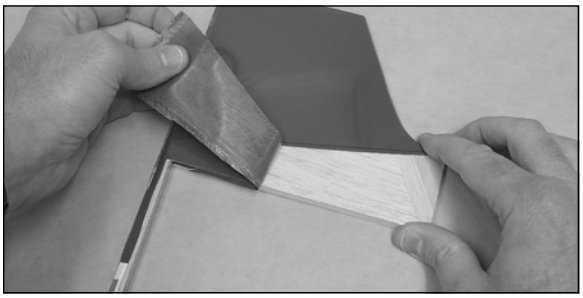


❑ Push the stabiliser down into the mounting slot, making sure that the rudder post is pushed firmly into the slot in the back of the fuselage.

IMPORTANT When pushing the stabiliser into the mounting slot, be careful not to crack the rudder post at the base of the stabiliser.



❑ Draw a line on each side of the stabiliser where it meets the top of the fuselage.



❑ Remove the stabiliser and carefully cut away the covering material from below the lines you drew. Cut away the covering material from the bottom of the stabiliser and from the sides and the front of the rudder post, too.

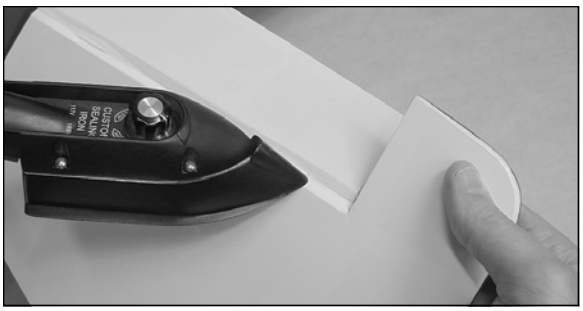
❑ Glue the stabiliser into place, using 30 minute epoxy. Double-check the alignment once more before the epoxy sets up, then wipe away any excess epoxy and use pieces of masking tape to hold the stabiliser in place until the epoxy has fully cured.

STEP 4: HINGING THE ELEVATOR HALVES

❑ Hinge the elevator halves to the horizontal stabiliser, using the same techniques that you used to hinge the ailerons to the wing. Each elevator half is hinged using two hinges and the tip of each elevator counter-balance should be even with the tips of the stabiliser. There should not be more than a 1/32" (.7mm) wide hinge gap.

IMPORTANT Remember to counter-sink the hinge pivot points and apply machine oil or petroleum jelly to the hinge pivot points to keep from gluing the hinges solid. Use the same techniques that you used for the aileron hinges.

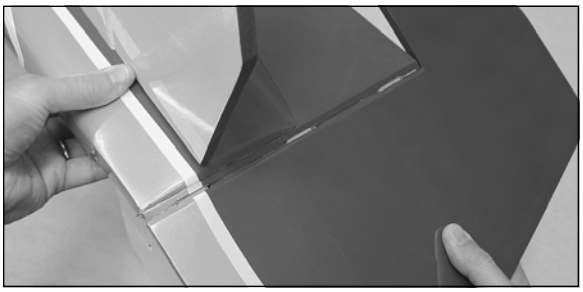
STEP 5: SEALING THE ELEVATOR HINGE GAPS



❑ Cut two pieces of white covering material 1/2" (13mm) wide and 8-3/8" (213mm) long.

❑ Seal the elevator hinge gaps, using the same techniques that you used to seal the aileron hinge gaps.

STEP 6: HINGING THE RUDDER



❑ Hinge the rudder to the vertical stabiliser, using the same techniques that you used to hinge the elevator halves to the horizontal stabiliser. The rudder is hinged using three hinges and the bottom of the rudder should be even with the bottom of the fuselage. There should not be more than a 1/32" (.7mm) wide hinge gap.

IMPORTANT Although you need to seal the aileron and elevator hinge gaps, it's not necessary to seal the rudder hinge gap.

TAIL WHEEL INSTALLATION

YOU'LL NEED THE FOLLOWING PARTS FROM THE KIT:

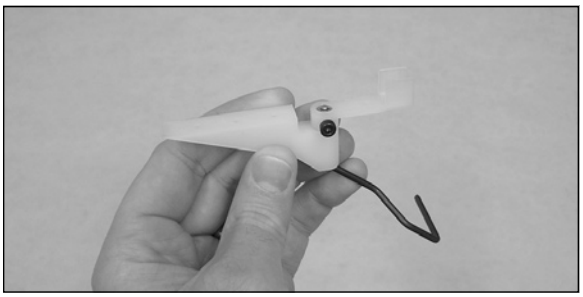
- ❑ (1) Tail Wheel Wire
- ❑ (1) Tail Wheel
- ❑ (1) Nylon Tail Wheel Mounting Bracket
- ❑ (1) Nylon Steering Arm
- ❑ (3) M3 x 12mm Wood Screws
- ❑ (1) M2 x 12mm Wood Screw
- ❑ (3) Wheel Collars
- ❑ (2) Grub Screws
- ❑ (1) M3 x 6mm Socket-Cap Screw
- ❑ (1) 1.5mm Hex Wrench

YOU'LL NEED THE FOLLOWING TOOLS AND SUPPLIES:

- ❑ Thick C/A
- ❑ #1 and # 2 Phillips Head Screwdrivers
- ❑ 2.5mm Hex Wrench
- ❑ Electric Drill
- ❑ 5/64" (2mm) Drill Bit
- ❑ Pencil
- ❑ Rotary Tool with Cutting Disc
- ❑ Airplane Stand

STEP 1: ASSEMBLING THE TAIL WHEEL BRACKET

❑ Push one wheel collar into the top of the steering arm, making sure that the threaded hole in the wheel collar lines up with the hole in the side of the steering arm. Partially thread the M3 x 6mm socket-cap screw into the wheel collar.

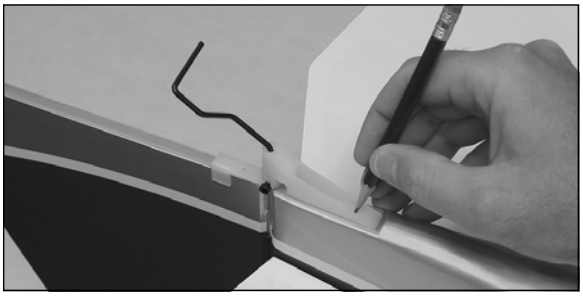


❑ Push the tail wheel wire up through the tail wheel mounting bracket, then slide the steering arm over the tail wheel wire and push it down against the mounting bracket.

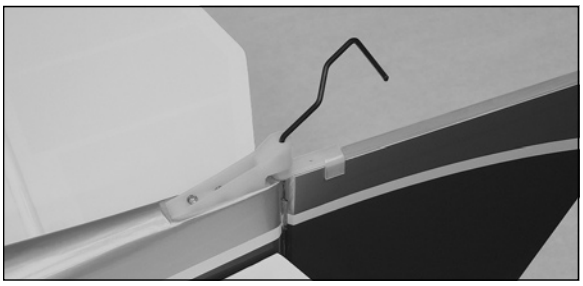
❑ Rotate both the tail wheel wire and the steering arm so that they face the back of the mounting bracket. While holding the two in alignment, tighten the socket-cap screw, then cut the end of the tail wheel wire off flush with the top of the steering arm.

STEP 2: INSTALLING THE TAIL WHEEL ASSEMBLY

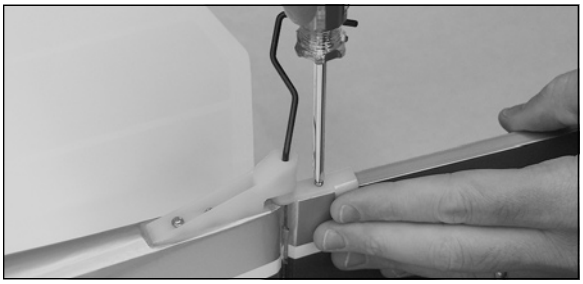
❑ Place the tail wheel mounting bracket onto the fuselage, making sure that the mounting bracket is centred and that the steering arm pivot point is even with the rudder hinge line. The steering arm mounting tabs should fit over the bottom of the rudder, too.



❑ When satisfied with the alignment, mark the locations of the three mounting screws onto the fuselage.



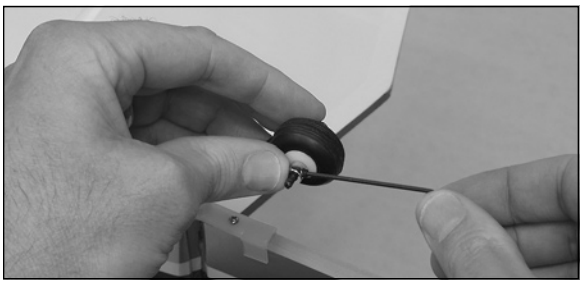
❑ Drill three 5/64" (2mm) diameter pilot holes through the fuselage, then install the tail wheel mounting bracket, using three M3 x 12mm wood screws.



❑ Thread the M2 x 12mm wood screw through the hole in the bottom of the steering arm mounting bracket and into the rudder, to secure the steering arm into place.

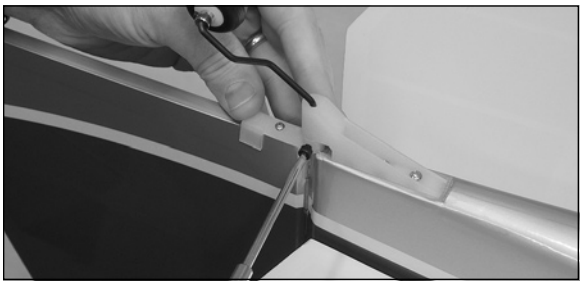
IMPORTANT Apply a drop of thick C/A to the threads to help secure the wood screw more firmly.

STEP 3: INSTALLING THE TAIL WHEEL



❑ Slide one wheel collar with grub screw onto the axle, then slide the tail wheel onto the axle.

❑ Secure the tail wheel to the axle, using the remaining wheel collar and grub screw. After tightening the grub screws, double-check that the tail wheel spins freely.



❑ Centre the rudder, then loosen the socket-cap screw in the side of the steering arm.

❑ Align the tail wheel wire with the bottom of the rudder, then tighten the socket-cap screw firmly.

MAIN LANDING GEAR INSTALLATION

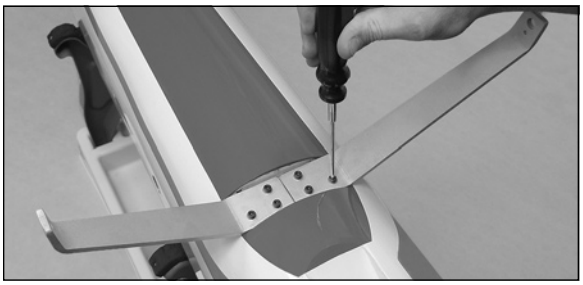
YOU'LL NEED THE FOLLOWING PARTS FROM THE KIT:

- ❑ (2) Fiberglass Wheel Pants
- ❑ (2) Main Landing Gear Brackets
- ❑ (2) Main Gear Wheels
- ❑ (2) Threaded Axles
- ❑ (2) M8 Lock Nuts
- ❑ (6) M4 x 12mm Socket-Cap Screws
- ❑ (2) M3 x 10mm Machine Screws
- ❑ (6) M4 Flat Washers
- ❑ (2) M3 Blind Nuts
- ❑ (4) Wheel Collars
- ❑ (4) Grub Screws
- ❑ (1) 1.5mm Hex Wrench

YOU'LL NEED THE FOLLOWING TOOLS AND SUPPLIES:

- ❑ Thick C/A
- ❑ # 1 Phillips Head Screwdriver
- ❑ 3mm Hex Wrench
- ❑ Adjustable Wrenches (2)
- ❑ Modeling Knife
- ❑ Electric Drill
- ❑ 5/32" (4mm) Drill Bit
- ❑ Straight Edge Ruler
- ❑ Pencil
- ❑ Rotary Tool with Cutting Disc and Sanding Drum
- ❑ Airplane Stand

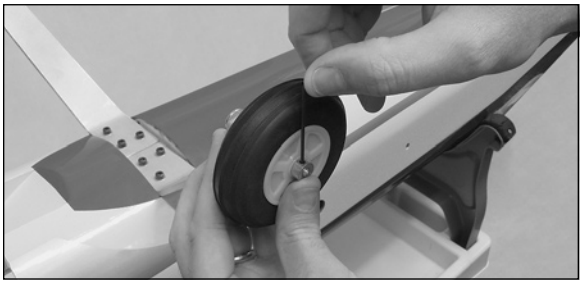
STEP 1: INSTALLING THE LANDING GEAR BRACKETS



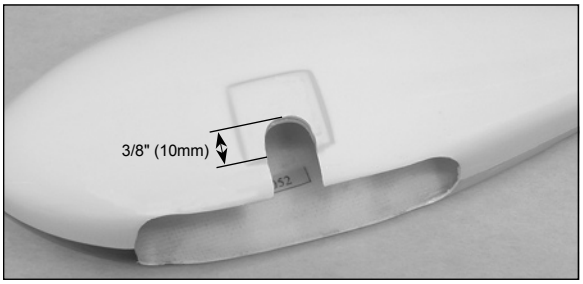
❑ Install the two main landing gear brackets onto the fuselage, using six M4 x 12mm socket-cap screws and six M4 flat washers.

❑ Install one threaded axle onto each landing gear bracket, using two M8 lock nuts. Make sure to tighten the lock nuts firmly to hold the threaded axles securely into place.

STEP 2: INSTALLING THE MAIN GEAR WHEELS AND WHEEL PANTS

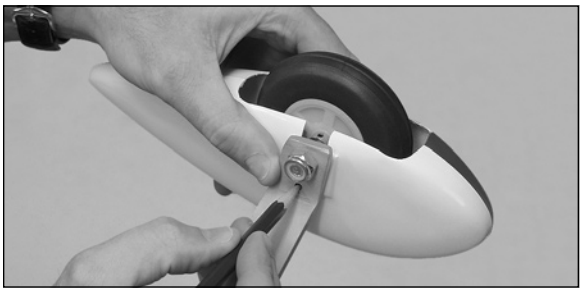


❑ Temporarily install one main gear wheel onto one axle, using two wheel collars and grub screws, making sure that the wheel is centred on the axle.



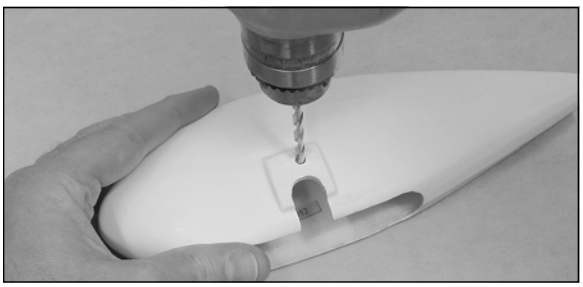
❑ Carefully measure and cut a 1/2" (13mm) wide slot in the inside of one wheel pant. The slot should be cut in the centre of the moulded mounting plate and the top of the slot should be 3/8" (10mm) from the bottom edge of the moulded mounting plate.

IMPORTANT Measure from the bottom of the moulded mounting plate, **not** from the bottom of the wheel pant.

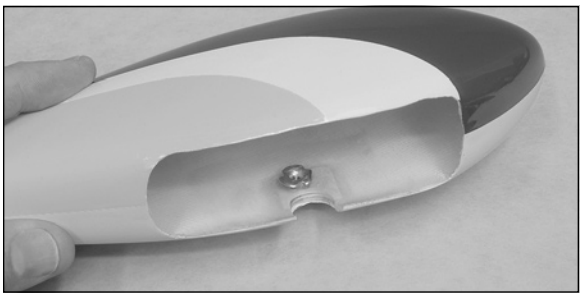


❑ Slide the wheel pant over the hex hub and the wheel. When aligned properly, the bottom edge of the wheel pant should be parallel to the bottom edge of the landing gear bracket.

❑ While holding the wheel pant in place, draw a mark on the side of the wheel pant, using the predrilled hole in the landing gear bracket as a guide.

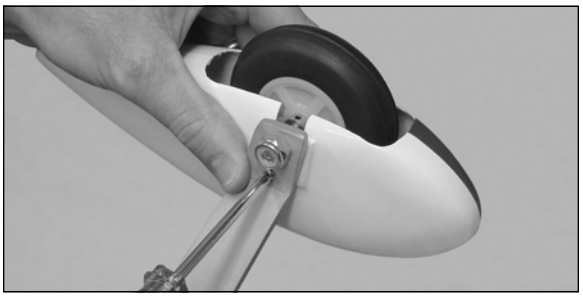


❑ Remove the wheel pant and carefully drill a 5/32" (4mm) diameter hole through the wheel pant at the mark you drew.



❑ Install one M3 blind nut into the wheel pant, then carefully apply a bead of thick C/A around the blind nut for extra security.

PRO TIP Thread one M3 x 10mm machine screw and one flat washer into the blind nut, then tighten the machine screw to draw the blind nut into place.



❑ Slide the wheel pant back into position and secure it to the landing gear bracket, using one M3 x 10mm machine screw.

❑ Loosen the grub screws in the wheel collars, centre the wheel between the sides of the wheel pant opening, then retighten the grub screws and double-check that the wheel spins freely.

❑ Repeat the previous procedures to install the second wheel and wheel pant assembly. When installing the second wheel pant, make sure that it's parallel to the first wheel pant.

ENGINE INSTALLATION

YOU'LL NEED THE FOLLOWING PARTS FROM THE KIT:

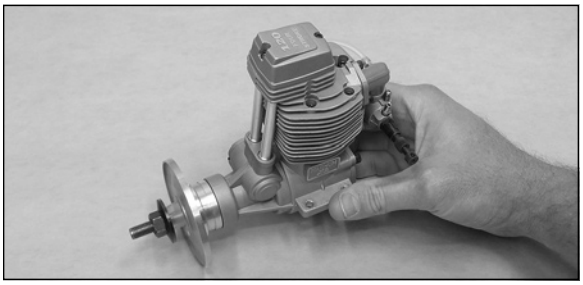
- ❑ (2) Aluminium Engine Mounting Beams
- ❑ (4) M4 x 35mm Socket-Cap Screws
- ❑ (4) M4 x 25mm Socket-Cap Screws
- ❑ (4) M4 Lock Nuts
- ❑ (4) M4 Blind Nuts
- ❑ (4) M4 Split Washers
- ❑ (12) M4 Flat Washers

YOU'LL NEED THE FOLLOWING TOOLS AND SUPPLIES:

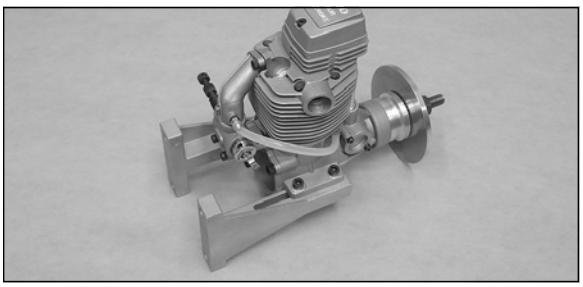
- ❑ 3mm Hex Wrench
- ❑ 7mm Nut Driver
- ❑ Straight Edge Ruler

STEP 1: INSTALLING THE ENGINE MOUNTING BEAMS

IMPORTANT The following procedures outline the installation of a four-stroke engine. If you are installing a two-stroke engine, the installation procedures are the same. The Magnum XL 1.20RFS engine is shown.



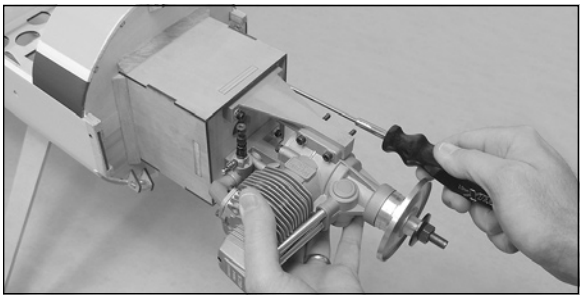
❑ Remove the muffler assembly from your engine, then install your spinner backplate (not included) onto the crankshaft, using the propeller washer and nut included with your engine.



❑ Temporarily mount your engine onto the engine mounting beams, using four M4 x 35mm socket-cap screws, eight M4 flat washers and four M4 lock nuts.

PRO TIP Mount the engine as far forward as possible to ensure that the engine mounting beams remain square.

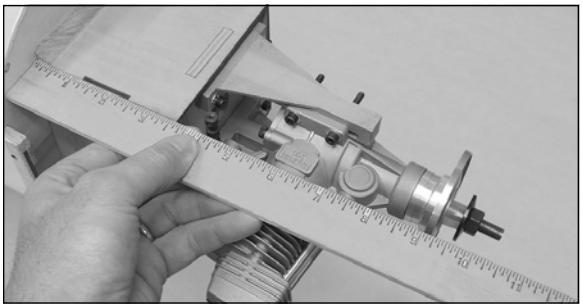
IMPORTANT The precut mounting slots in the firewall are elongated to allow you to mount engines of varying width. To ensure that the engine lines up with the centre of the cowl, it's important that the engine mounts be centred within the precut mounting slots.



❑ Line up the engine mounting beams within the precut slots in the firewall and temporarily install the four M4 x 25mm socket-cap screws, four M4 split washers, four M4 flat washers and four M4 blind nuts.

❑ Carefully centre the engine mounting beams over the precut slots and firmly tighten the four socket-cap screws to draw the blind nuts into the back of the firewall.

STEP 2: ALIGNING THE ENGINE



❑ Loosen the four socket-cap screws and lock nuts so that the engine can be slid back and forth.

❑ Measure the distance from the front of the fuselage to the back of the spinner backplate. Adjust the depth of the engine so that the measurement is 9" (229mm).

❑ When satisfied with the alignment, firmly tighten the four socket-cap screws and lock nuts.

FUEL TANK ASSEMBLY AND INSTALLATION

YOU'LL NEED THE FOLLOWING PARTS FROM THE KIT:

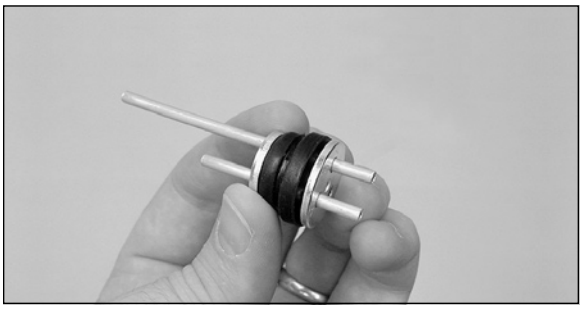
- ❑ (1) 500cc Fuel Tank
- ❑ (3) Aluminium Tubes
- ❑ (1) Rubber Stopper
- ❑ (1) Metal Plate - Small
- ❑ (1) Metal Plate - Large
- ❑ (1) Fuel Pick-up (Clunk)
- ❑ (1) Silicone Fuel Tubing
- ❑ (1) Metal Support Ring
- ❑ (1) M3 x 20mm Machine Screw

YOU'LL NEED THE FOLLOWING TOOLS AND SUPPLIES:

- ❑ Silicon Sealant
- ❑ # 2 Phillips Head Screwdriver
- ❑ Modeling Knife
- ❑ Scissors
- ❑ Straight Edge Ruler
- ❑ Pencil
- ❑ Masking Tape
- ❑ Airplane Stand

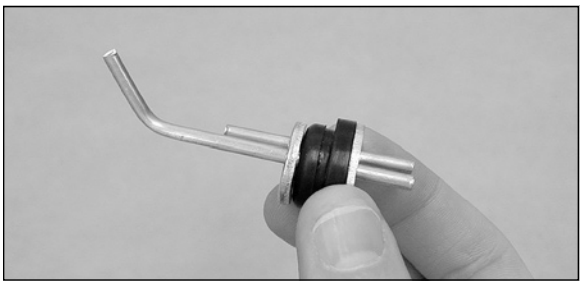
STEP 1: ASSEMBLING THE RUBBER STOPPER

IMPORTANT Discard the shortest aluminium tube. It will not be used for our style of fuel tank setup which uses a fuel valve. Only a fuel pick-up line and a muffler pressure line are required.



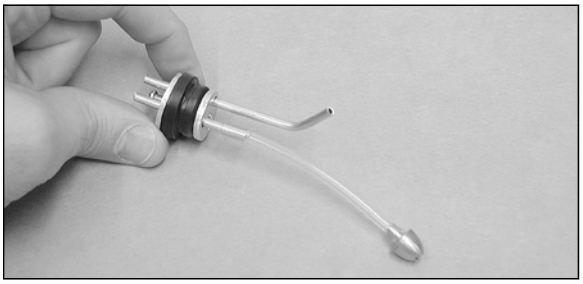
❑ Push the two aluminium tubes through the rubber stopper, then slide the large diameter metal plate over the tubes at the front of the rubber stopper and slide the small diameter metal plate over the tubes at the rear of the rubber stopper.

❑ Adjust the tubes so that they both are 3/8" (10mm) out from the front of the stopper assembly.



❑ Carefully bend the longer of the two aluminium tubes up at a shallow angle, being careful not to kink the tubing as you bend it.

IMPORTANT When the stopper assembly is installed into the fuel tank, the top of the pressure tube (the tube you just bent) should rest just below the top of the fuel tank.



❑ Secure one end of the silicone fuel tubing onto the end of the clunk.

❑ Slide the silicone fuel tubing, with the clunk attached, onto the end of the aluminium fuel pick-up tube (straight tube). Adjust the length of the silicone tubing until the end of the clunk is 4" (102mm) back from the rear of the stopper assembly.

STEP 2: INSTALLING THE RUBBER STOPPER ASSEMBLY

❑ Place the metal support ring over the neck of the fuel tank opening, then carefully push the stopper assembly into the fuel tank and rotate it until the aluminium pressure tube rests just below the top of the fuel tank.

❑ When satisfied with the alignment, install and tighten the M3 x 20mm machine screw until the rubber stopper expands and seals the fuel tank opening.

❑ With the stopper assembly installed, double-check to make sure that the clunk can move freely inside the fuel tank. Ideally, the clunk should be about 1/4" (6mm) in front of the back of the fuel tank. This will ensure that the clunk can't get stuck in the fuel tank during flight. Also double-check that the end of the pressure tube rests just below the top of the fuel tank.

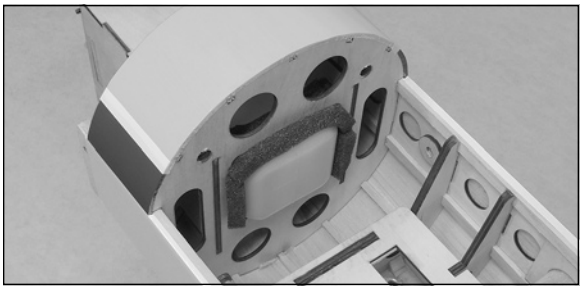
PRO TIP Holding the fuel tank up to a bright light will allow you to see inside to double-check the correct position of the clunk and the pressure tube.

STEP 3: INSTALLING THE FUEL TANK

❑ Cut two pieces of silicone fuel tubing (not included) to a length of 10" (254mm) and install them onto the aluminium tubes at the front of the fuel tank.

PRO TIP Mark the ends of the silicone tubing 'pressure' and 'pick-up' so that you don't confuse them when it comes time to connect them to the engine and the fuel valve later on.

❑ Feed the ends of the fuel tubing through the predrilled hole in the firewall and slide the fuel tank into position, making sure that the front of the fuel tank is pushed up against the back of the firewall. Double-check that the fuel tubing is not kinked.



❑ Use strips of foam rubber wedged between the fuel tank and the fuel tank support bulkhead (or your favorite method) to hold the fuel tank firmly in place.

❑ Apply a layer of silicon sealant to the fuel tank opening (around the fuel tubing) at the front of the firewall to prevent exhaust residue from getting inside the fuselage.

THROTTLE CONTROL SYSTEM INSTALLATION

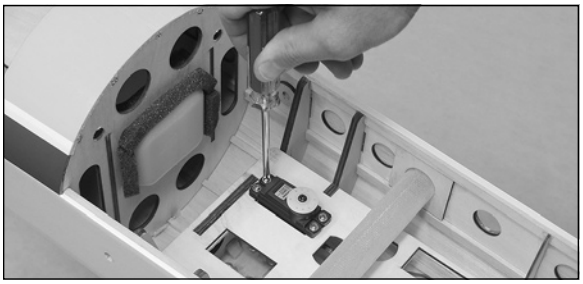
YOU'LL NEED THE FOLLOWING PARTS FROM THE KIT:

- ❑ (1) 18" (457mm) Pushrod Wire with Z-Bend
- ❑ (1) Adjustable Pushrod Connector with Nut and Grub Screw
- ❑ (1) 1.5mm Hex Wrench

YOU'LL NEED THE FOLLOWING TOOLS AND SUPPLIES:

- ❑ Thin C/A
- ❑ # 1 Phillips Head Screwdriver
- ❑ Wire Cutters
- ❑ Needle Nose Pliers
- ❑ Modeling Knife
- ❑ Electric Drill
- ❑ 1/16" (1.6mm), 5/64" (2mm) and 5/32" (4mm) Drill Bits
- ❑ Straight Edge Ruler
- ❑ Pencil
- ❑ Rotary Tool with Sanding Drum

STEP 1: INSTALLING THE THROTTLE SERVO

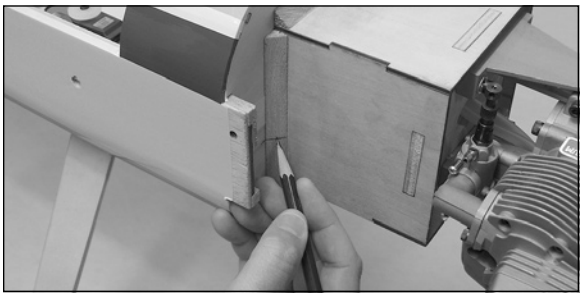


❑ Install the throttle servo into the forward mounting hole in the plywood servo tray that's on the same side of the fuselage as your engine's throttle arm, making sure to drill 1/16" (1.6mm) diameter pilot holes for the servo mounting screws.

IMPORTANT Note the orientation of the servo. When installed, the servo output shaft should be toward the back of the fuselage.

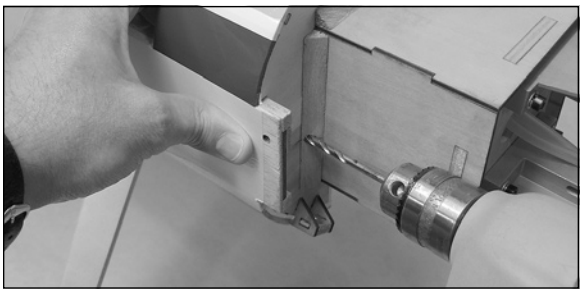
STEP 2: INSTALLING THE THROTTLE PUSHROD WIRE

IMPORTANT If you haven't already done so, you should pivot your engine's throttle arm so that it points toward the outside edge of the engine mounting box. In most cases, the throttle pushrod wire will be installed toward the outside edge of the engine mounting box, as shown in these assembly instructions. If your engine's throttle arm does not extend beyond the outside edge of the engine mounting box, the throttle pushrod wire can be run through the engine mounting box. Just be sure not to interfere with the fuel tank.



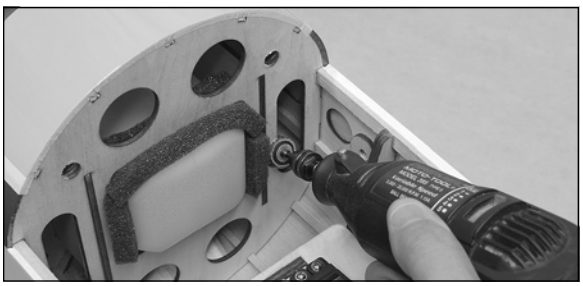
❑ Mark the location of the throttle pushrod exit hole on the front of the fuselage.

IMPORTANT Mark the position of the throttle pushrod exit hole as close to the same height as your engine's throttle arm as possible and as close to the side of the engine mounting box as possible.



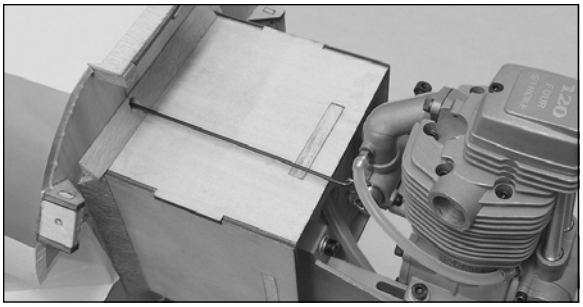
❑ Drill a 5/32" (4mm) diameter hole through the front of the fuselage at the mark you drew.

☞ We suggest that you temporarily remove the engine to make it easier to drill the hole accurately.



❑ Use a rotary tool with a sanding drum to cut a shallow notch in the edge of the fuel tank support bulkhead for the pushrod wire to pass through.

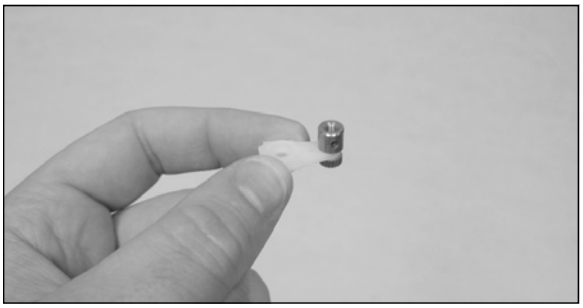
IMPORTANT If you've had to install the throttle pushrod wire through the engine mounting box, you will need to drill a hole through the fuel tank support bulkhead for the throttle pushrod wire to pass through.



❑ Install the Z-Bend in the pushrod wire into the **outermost hole** in your engine's throttle arm, slide the pushrod wire through the hole that you drilled in the front of the fuselage, then reinstall your engine.

IMPORTANT Depending on the engine you're using, it might be necessary to make a shallow bend in the pushrod wire to achieve perfect alignment, or to prevent the pushrod wire from hitting the side of the engine mounting box.

STEP 3: INSTALLING THE ADJUSTABLE PUSHROD CONNECTOR



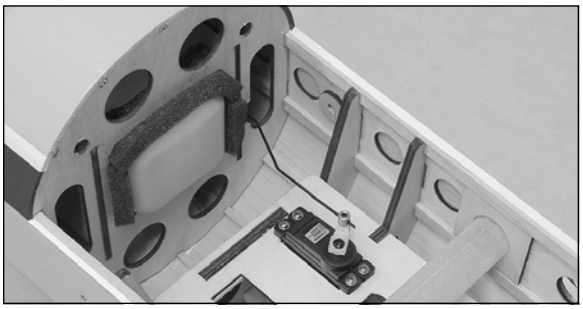
❑ Cut away all but one arm from a '4-point' servo horn, then enlarge the **outermost hole** in the servo arm, using a 5/64" (2mm) diameter drill bit.

❑ Install the adjustable pushrod connector onto the servo arm, making sure not to tighten the nut too tightly. You don't want the pushrod connector loose, but it should be able to rotate without binding.

IMPORTANT To prevent the nut from loosening during flight, apply a drop of thin C/A to it.

❑ Connect your radio control system, check that the throttle servo output shaft is rotating in the correct direction, then position the throttle control stick and the throttle trim lever to their lowest positions.

IMPORTANT Depending on the length of the servo arm that you're using, you may need to make a bend in the pushrod wire to line up with the adjustable pushrod connector in the next procedure.



❑ Slide the adjustable pushrod connector assembly onto the pushrod wire, then install the servo horn onto the servo, making sure that the servo horn is angled approximately 30 degrees from centre.

❑ While holding the carburetor fully closed, install and tighten the grub screw in the top of the adjustable pushrod connector.

❑ Cut away the excess pushrod wire, then install and tighten the servo horn retaining screw to hold the servo horn securely to the servo.

❑ Open and close the throttle several times to ensure that the carburetor opens and closes completely and without binding. You may need to adjust your transmitter EPA settings to achieve perfect settings.

ELEVATOR CONTROL SYSTEM INSTALLATION (PUSH-PULL OPTION)

YOU'LL NEED THE FOLLOWING PARTS FROM THE KIT:

- ❑ (2) 8-1/2" (216mm) Threaded Pushrod Wires
- ❑ (2) M3 x 40mm Machine Screws
- ❑ (4) Metal Clevises - 3mm Thread
- ❑ (4) M3 Hex Nuts
- ❑ (2) Nylon Adjustable Control Horns
- ❑ (4) M3 Flat Washers
- ❑ (2) M3 Lock Nuts
- ❑ (1) Heat-Shrink Tubing

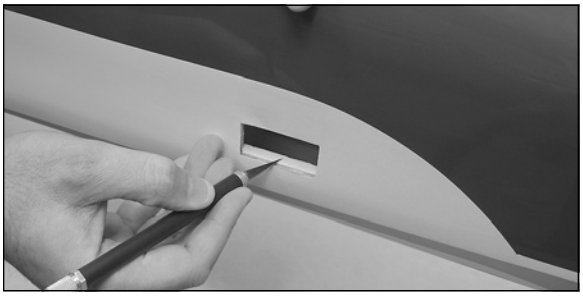
YOU'LL NEED THE FOLLOWING TOOLS AND SUPPLIES:

- ❑ # 1 and # 2 Phillips Head Screwdrivers
- ❑ Adjustable Wrench
- ❑ Modeling Knife
- ❑ Electric Drill
- ❑ 1/16" (1.6mm) Drill Bit
- ❑ Straight Edge Ruler
- ❑ Pencil
- ❑ Masking Tape
- ❑ Airplane Stand
- ❑ Heat Gun

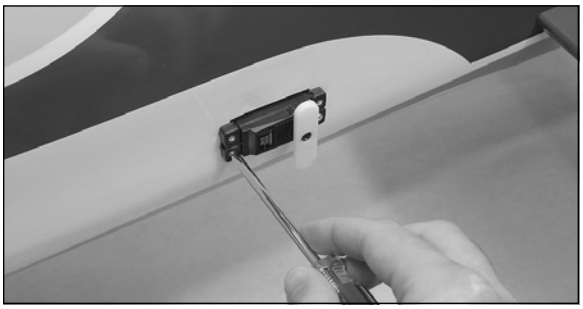
IMPORTANT This section details the installation of the push-pull rear mounted elevator control system. Use this option if you are using a heavier engine on the high end of the recommended size range. Mounting the servos in the back of the fuselage will help balance the aircraft by off-setting the added weight of the larger engine.

If you prefer to install the pull-pull elevator control system with the servos mounted below the cockpit deck instead, please skip to the next section on page 25.

STEP 1: INSTALLING THE ELEVATOR SERVOS



❑ Cut away the covering material from over the elevator servo mounting hole in each side of the fuselage. Each servo mounting hole is located 14-1/4" (362mm) in front of the rudder hinge line and 2-1/2" (64mm) up from the bottom of the fuselage.

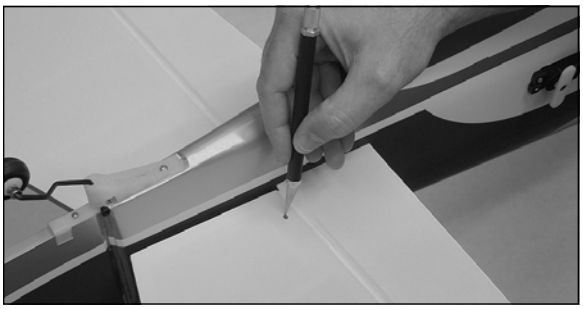


❑ Install one elevator servo into each mounting hole, making sure to drill 1/16" (1.6mm) diameter pilot holes for the servo mounting screws.

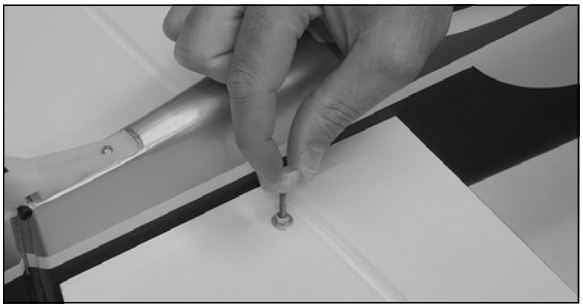
IMPORTANT Note the orientation of the servos. When installed, both servo output shafts should be toward the back of the fuselage.

IMPORTANT Both elevator servos and control linkages are mirrored to ensure the highest degree of accuracy between the right and left sides, therefore, you will need to either plug each elevator servo separately into your receiver and use a transmitter mix to make both servos move the same direction, or you will need to use a Y-Harness with an electronic reverser to make both servos move the same direction.

STEP 2: INSTALLING THE ELEVATOR CONTROL HORNS



❑ Cut away the covering material from over the top and the bottom of the elevator control horn mounting hole in one elevator half. The control horn mounting hole is located 7/8" (22mm) out from the inside edge of the elevator half and 3/8" (10mm) back from the leading edge of the elevator half.

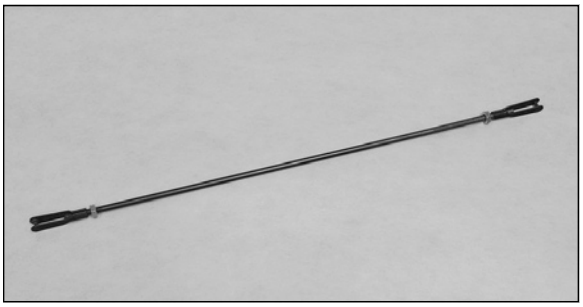


❑ Slide one M3 flat washer onto one M3 x 40mm machine screw, then push the machine screw up through the control horn mounting hole. Slide a second M3 flat washer onto the machine screw, then thread one M3 lock nut onto the machine screw and tighten it firmly.

❑ Thread one nylon adjustable control horn onto the machine screw until the control horn is flush with the end of the machine screw, then repeat the previous procedures to install the elevator control horn onto the other elevator half.

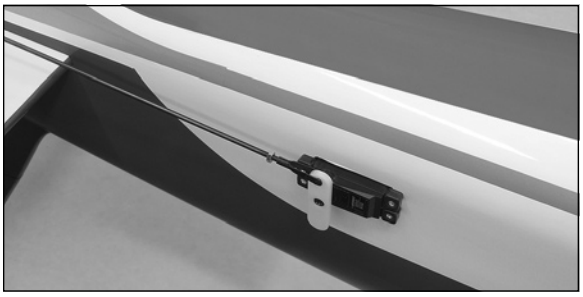
STEP 3: INSTALLING THE ELEVATOR CONTROL LINKAGES

❑ Use a couple of pieces of masking tape, taped between one elevator half and the stabiliser, to hold the elevator half centred.

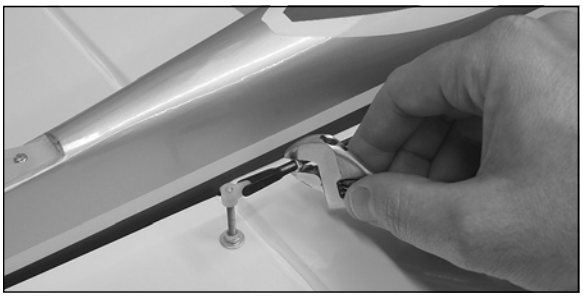


❑ Temporarily thread one M3 hex nut and one 3mm clevis onto each end of one 8-1/2" (216mm) threaded pushrod wire.

❑ Centre the elevator servo and install a servo horn onto the servo, making sure that the servo arm is centred and points toward the bottom of the fuselage. Install the servo horn retaining screw to secure the servo horn to the servo.

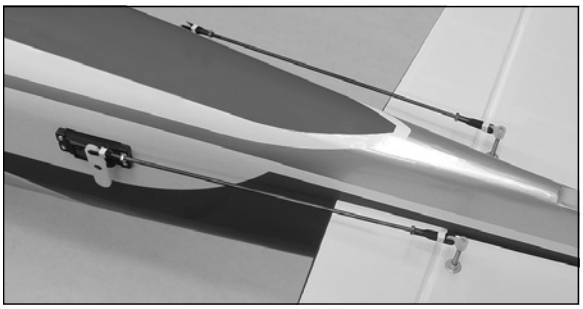


❑ Snap the clevis on one end of the threaded pushrod wire into the hole in the servo arm that is 3/4" (19mm) out from the centre of the servo horn.



❑ Adjust the length of the pushrod wire by adjusting the two clevises, then snap the second clevis into the hole in the adjustable control horn.

❑ With both the elevator half and the servo horn centred, firmly tighten the two hex nuts up against the two clevises to lock the pushrod wire into place.



❑ Repeat the previous procedures to assemble and install the second elevator control linkage.

❑ Remove the masking tape from the elevator halves and double-check that both servo horns and both elevator halves are still centred. If the elevator halves are not centred, readjust the clevises until they are.

❑ Move the elevator halves up and down several times to ensure that the control linkages do not bind. They should operate smoothly in both directions.

IMPORTANT It's important that both elevator halves track evenly together throughout the entire range of deflection. If one elevator half moves more than the other, this will cause the aircraft to roll when it pitches up or down during flight.

Looking from the back of the fuselage at the trailing edge of both elevator halves, slowly move the elevator halves up and down several times (using the transmitter control stick) to ensure that both elevator halves track evenly together throughout the entire range of deflection.

If the elevator halves do not track together (i.e., one elevator half moves more than the other though the range of deflection), you will need to thread one or both of the adjustable control horns up or down slightly until both elevator halves track evenly. Depending on your radio control system, and if you've plugged each elevator servo separately into your receiver, you may be able to make adjustments to each elevator half separately via your transmitter. Please refer to your radio control system's User's Guide for more information.

❑ Once you are satisfied with the alignment and setup, cut four 1/8" (3mm) long pieces of heat-shrink tubing and slide one piece over each clevis (see photo above). The heat-shrink tubing will ensure that the clevises do not open up during flight.

ELEVATOR CONTROL SYSTEM INSTALLATION (PULL-PULL OPTION)

YOU'LL NEED THE FOLLOWING PARTS FROM THE KIT:

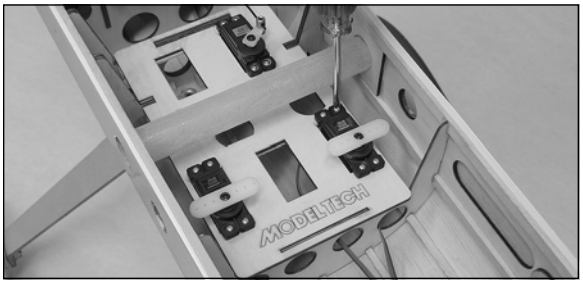
- ❑ (2) Stranded Cables
- ❑ (2) M3 x 70mm Threaded Rods
- ❑ (4) Nylon Adjustable Control Horns
- ❑ (4) Threaded Couplers
- ❑ (4) Z-Bend Couplers
- ❑ (4) Metal Clevises - 2mm Thread
- ❑ (8) Crimp Collets
- ❑ (4) M3 Flat Washers
- ❑ (4) M3 Lock Nuts
- ❑ (4) M2 Hex Nuts
- ❑ (1) Heat-Shrink Tubing

YOU'LL NEED THE FOLLOWING TOOLS AND SUPPLIES:

- ❑ Thin C/A
- ❑ # 1 Phillips Head Screwdriver
- ❑ Wire Cutters
- ❑ Adjustable Wrench
- ❑ Needle Nose Pliers
- ❑ Modeling Knife
- ❑ Electric Drill
- ❑ 1/16" (1.6mm) and 5/64" (2mm) Drill Bits
- ❑ Straight Edge Ruler
- ❑ Pencil
- ❑ Masking Tape
- ❑ Airplane Stand
- ❑ Heat Gun

IMPORTANT This section details the installation of the pull-pull elevator control system. Use this option if you are using a lighter weight engine or you simply want to use the pull-pull control system for improved control authority.

STEP 1: INSTALLING THE ELEVATOR SERVOS

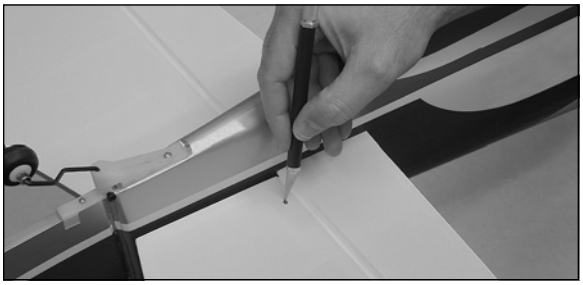


❑ Install one elevator servo into each outer rear servo mounting hole in the plywood servo tray, making sure to drill 1/16" (1.6mm) diameter pilot holes for the servo mounting screws.

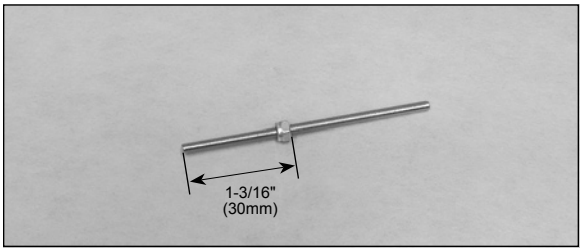
IMPORTANT Note the orientation of the servos. When installed, both servo output shafts should be toward the back of the fuselage.

IMPORTANT Both elevator servos and control linkages are mirrored to ensure the highest degree of accuracy between the right and left sides, therefore, you will need to either plug each elevator servo separately into your receiver and use a transmitter mix to make both servos move the same direction, or you will need to use a Y-Harness with an electronic reverser to make both servos move the same direction.

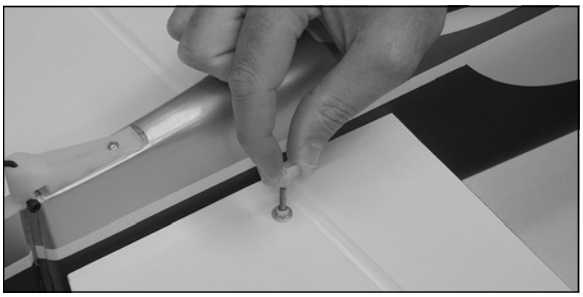
STEP 2: INSTALLING THE ELEVATOR CONTROL HORNS



❑ Cut away the covering material from over the top and the bottom of the elevator control horn mounting hole in one elevator half. The control horn mounting hole is located 7/8" (22mm) out from the inside edge of the elevator half and 3/8" (10mm) back from the leading edge of the elevator half.



❑ Thread one 3mm lock nut onto one M3 x 70mm threaded rod so that the base of the lock nut is 1-3/16" (30mm) away from the end of the threaded rod.

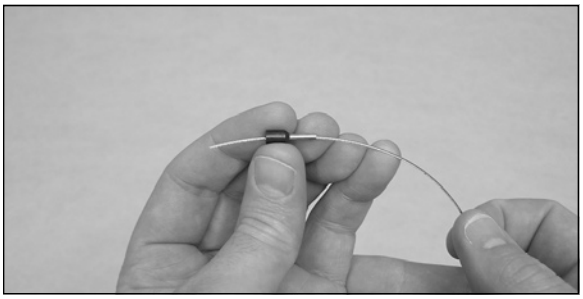


❑ Slide one M3 flat washer onto the threaded rod and up against the lock nut, then push the threaded rod up through the control horn mounting hole. Slide a second M3 flat washer onto the threaded rod, then thread one M3 lock nut onto the threaded rod and tighten it firmly, making sure that the threaded rod is centred. Both ends of the threaded rod should be approximately 1-1/4" (32mm) from the surface of the elevator half.

❑ Thread one nylon adjustable control horn onto each end of the threaded rod until both control horns are flush with the ends of the threaded rod.

❑ Repeat the previous procedures to install the elevator control horn onto the other elevator half.

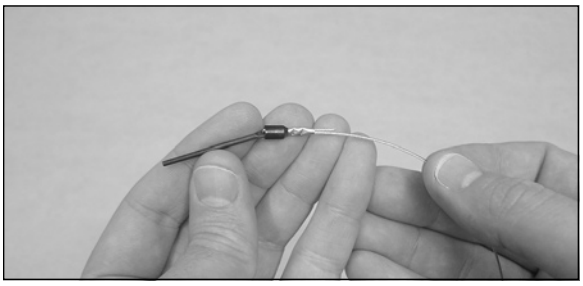
STEP 3: INSTALLING THE ELEVATOR PULL-PULL CABLES



❑ Using a pair of wire cutters, carefully cut one length of stranded cable exactly in half.

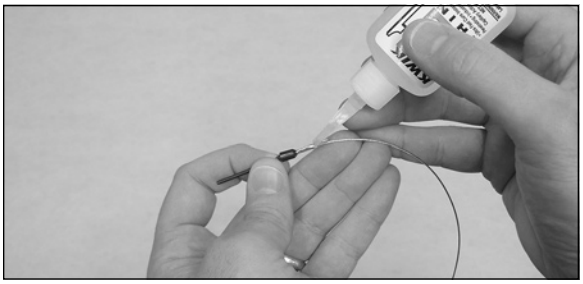
PRO TIP If the ends of the cable begin to unravel, use your fingers to twist the ends back into shape.

❑ Slide one crimp collet, non-flanged side first, over one end of one length of stranded cable.



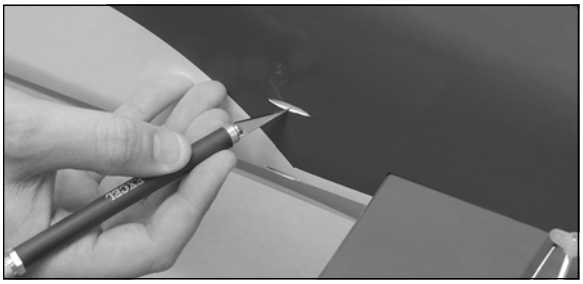
❑ Carefully thread the same end of the stranded cable through the hole in one threaded coupler, then slide the end of the stranded cable back through the crimp collet.

❑ Hold the short end of the stranded cable with a pair of pliers and firmly slide the crimp collet forward so that the flange covers the end of the threaded coupler. Firmly squeeze the crimp collet, using a pair of pliers, to lock the stranded cable into place.

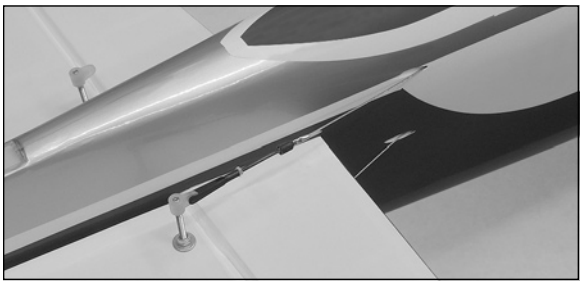


❑ Apply a couple of drops of thin C/A to the crimp collet. The C/A will 'wick' between the crimp collet and the stranded cable, making the joint even stronger.

❑ Repeat the previous procedures to install a threaded coupler onto one end of the other length of stranded cable.

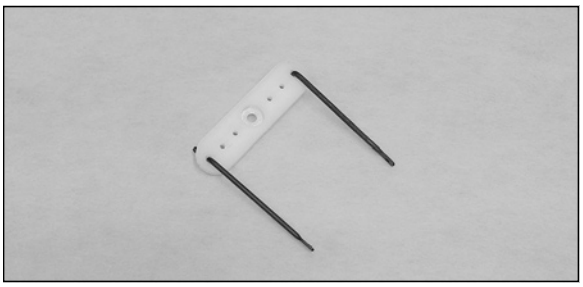


❑ Cut away the covering material from over the two elevator pull-pull exit slots in one side of the fuselage. Both slots are located 2" (50mm) in front of the horizontal stabiliser. The upper slot is located 5/8" (16mm) up from the horizontal stabiliser and the lower slot is located 1-3/4" (45mm) below the upper slot.



❑ Temporarily thread one M2 hex nut and one 2mm clevis onto each of the two threaded couplers, then feed the plain end of each of the two lengths of stranded cable through the slots in the fuselage and into the servo compartment.

❑ Snap each clevis into the hole in the adjustable control horns, then firmly tighten the two hex nuts up against the clevises to lock the threaded coupler into place.



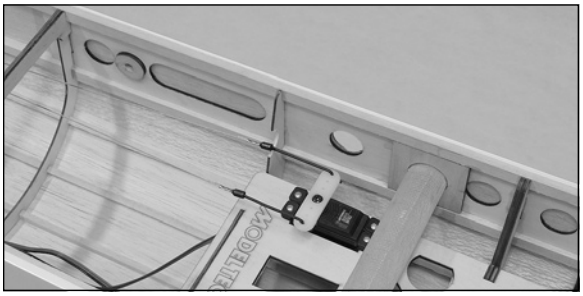
❑ Enlarge the hole in each side of a servo horn that is 3/4" (19mm) out from the centre of the servo horn, using a 5/64" (2mm) diameter drill bit.

❑ Install one Z-Bend coupler into the hole in each side of the servo horn that you enlarged.

❑ Centre the elevator servo and install the servo horn onto the servo, making sure that it's centred, then install the servo horn retaining screw to secure the servo horn to the servo.

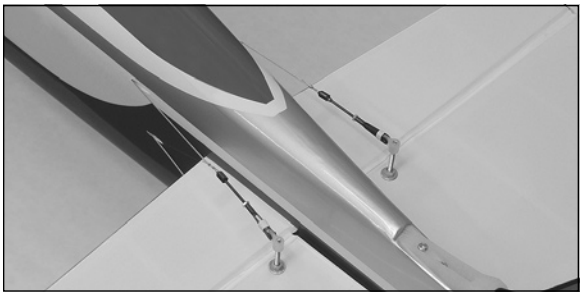
IMPORTANT You may need to cut a shallow notch in the edge of the servo tray support bulkhead to clear the Z-Bend coupler.

❑ Use a couple of pieces of masking tape, taped between the elevator half and the stabiliser, to hold the elevator half centred.



❑ Attach the stranded cable from the **bottom** of the elevator to the Z-Bend coupler nearest the **side** of the fuselage, then attach the stranded cable from the **top** of the elevator to the Z-Bend coupler nearest the **centre** of the fuselage. Use the same techniques that you used to attach the stranded cable to the threaded couplers.

IMPORTANT Make sure that both lengths of stranded cable are pulled tight. There should not be any slack in either of the two stranded cables.



❑ Repeat the previous procedures to assemble and install the second set of stranded cables and threaded couplers to the other elevator half.

❑ Repeat the previous procedures to secure the second set of stranded cables and Z-Bend couplers to the second elevator servo.

IMPORTANT Remember to attach the stranded cable from the **bottom** of the elevator to the Z-Bend coupler nearest the **side** of the fuselage, then attach the stranded cable from the **top** of the elevator to the Z-Bend coupler nearest the **centre** of the fuselage, to ensure both sides are the same.

❑ Remove the masking tape from the elevator halves and double-check that both servo horns and both elevator halves are still centred. If the elevator halves are not centred, readjust the clevises until they are.

❑ Move the elevator halves up and down several times to ensure that the control linkages do not bind. They should operate smoothly in both directions.

❑ Check the tension of the stranded cables for each elevator half. To do this do the following: move the elevator control stick back. Let the control stick go and check to see if the elevator halves return to centre. Do this a couple of times in each direction. If the elevator halves do not come back to centre, one or both stranded cables are too tight. You can adjust the tension of the stranded cables by adjusting the clevises. Ideally, the stranded cables should be as tight as possible, while still allowing the elevator halves to return to centre. The stranded cables should not have slack in them, yet they should not be so tight that the linkage(s) and/or the servo(s) bind.

IMPORTANT It's important that both elevator halves track evenly together throughout the entire range of deflection. If one elevator half moves more than the other, this will cause the aircraft to roll when it pitches up or down during flight.

Looking from the back of the fuselage at the trailing edge of both elevator halves, slowly move the elevator halves up and down several times (using the transmitter control stick) to ensure that both elevator halves track evenly together throughout the entire range of deflection.

If the elevator halves do not track together (i.e., one elevator half moves more than the other though the range of deflection), you will need to thread one or both of the adjustable control horns up or down slightly until both elevator halves track evenly. Depending on your radio control system, and if you've plugged each elevator servo separately into your receiver, you may be able to make adjustments to each elevator half separately via your transmitter. Please refer to your radio control system's User's Guide for more information.

❑ Once you are satisfied with the alignment and setup, cut four 1/8" (3mm) long pieces of heat-shrink tubing and slide one piece over each clevis (see photos on previous page). The heat-shrink tubing will ensure that the clevises do not open up during flight.

RUDDER CONTROL SYSTEM INSTALLATION

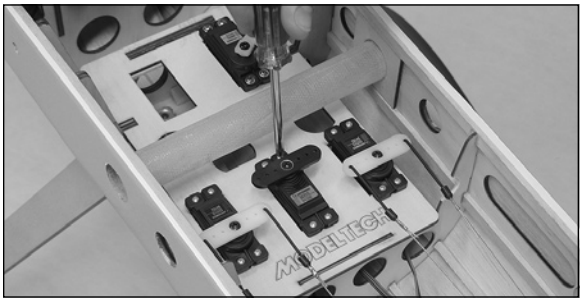
YOU'LL NEED THE FOLLOWING PARTS FROM THE KIT:

- ❑ (1) Stranded Cable
- ❑ (1) M3 x 70mm Threaded Rod
- ❑ (2) Nylon Adjustable Control Horns
- ❑ (2) Threaded Couplers
- ❑ (2) Z-Bend Couplers
- ❑ (2) Metal Clevises - 2mm Thread
- ❑ (4) Crimp Collets
- ❑ (2) M3 Flat Washers
- ❑ (2) M3 Lock Nuts
- ❑ (2) M2 Hex Nuts
- ❑ (1) Heat-Shrink Tubing

YOU'LL NEED THE FOLLOWING TOOLS AND SUPPLIES:

- ❑ Thin C/A
- ❑ # 1 Phillips Head Screwdriver
- ❑ Wire Cutters
- ❑ Adjustable Wrench
- ❑ Needle Nose Pliers
- ❑ Modeling Knife
- ❑ Electric Drill
- ❑ 1/16" (1.6mm) and 5/64" (2mm) Drill Bits
- ❑ Straight Edge Ruler
- ❑ Pencil
- ❑ Masking Tape
- ❑ Airplane Stand
- ❑ Heat Gun

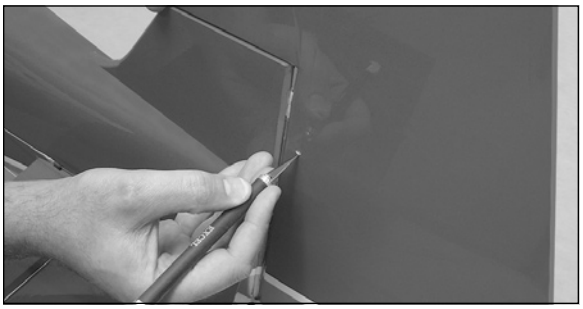
STEP 1: INSTALLING THE RUDDER SERVO



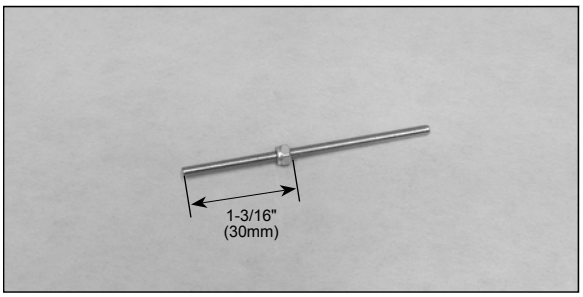
❑ Install the rudder servo into the centre servo mounting hole in the plywood servo tray, making sure to drill 1/16" (1.6mm) diameter pilot holes for the servo mounting screws.

IMPORTANT Note the orientation of the servo. When installed, the servo output shaft should be toward the front of the fuselage.

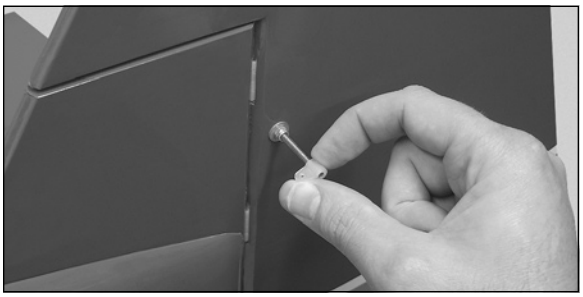
STEP 2: INSTALLING THE RUDDER CONTROL HORN



❑ Cut away the covering material from over both sides of the rudder control horn mounting hole in the rudder. The control horn mounting hole is located 6-1/2" (165mm) up from the bottom of the rudder and 3/8" (10mm) back from the leading edge of the rudder.



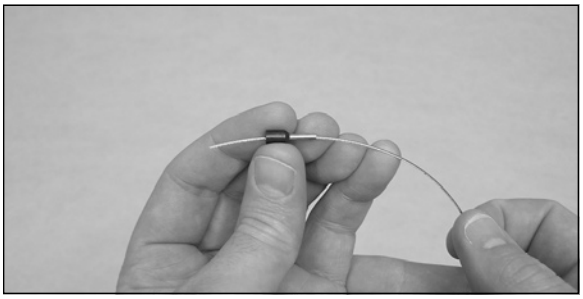
❑ Thread one 3mm lock nut onto the M3 x 70mm threaded rod so that the base of the lock nut is 1-3/16" (30mm) away from the end of the threaded rod.



❑ Slide one M3 flat washer onto the threaded rod and up against the lock nut, then push the threaded rod through the control horn mounting hole. Slide a second M3 flat washer onto the threaded rod, then thread one M3 lock nut onto the threaded rod and tighten it firmly, making sure that the threaded rod is centred. Both ends of the threaded rod should be approximately 1-1/4" (32mm) from the surface of the rudder.

❑ Thread one nylon adjustable control horn onto each end of the threaded rod until both control horns are flush with the ends of the threaded rod.

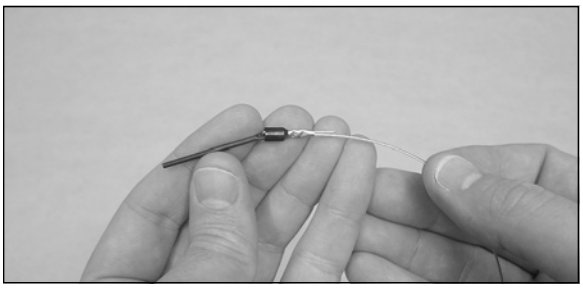
STEP 3: INSTALLING THE RUDDER PULL-PULL CABLES



❑ Using a pair of wire cutters, carefully cut one length of stranded cable exactly in half.

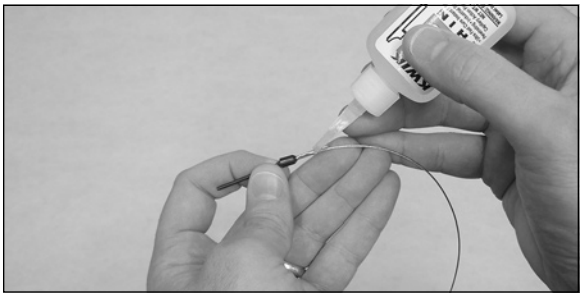
PRO TIP If the ends of the cable begin to unravel, use your fingers to twist the ends back into shape.

❑ Slide one crimp collet, non-flanged side first, over one end of one length of stranded cable.



❑ Carefully thread the same end of the stranded cable through the hole in one threaded coupler, then slide the end of the stranded cable back through the crimp collet.

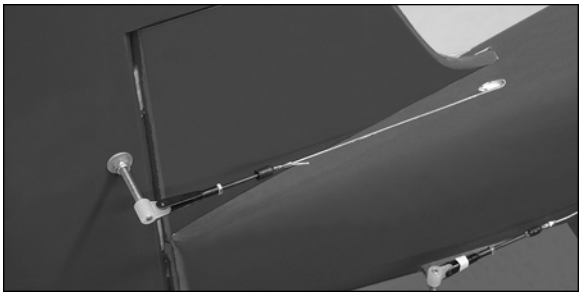
❑ Hold the short end of the stranded cable with a pair of pliers and firmly slide the crimp collet forward so that the flange covers the end of the threaded coupler. Firmly squeeze the crimp collet, using a pair of pliers, to lock the stranded cable into place.



❑ Apply a couple of drops of thin C/A to the crimp collet. The C/A will 'wick' between the crimp collet and the stranded cable, making the joint even stronger.

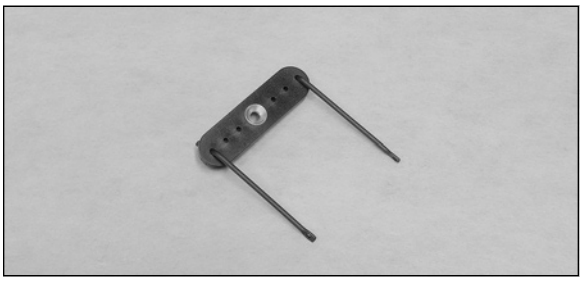
❑ Repeat the previous procedures to install the second threaded coupler onto one end of the other length of stranded cable.

❑ Cut away the covering material from over the rudder pull-pull exit slot in each side of the fuselage. Each slot is located 3/8" (10mm) out from the sides of the vertical stabiliser and 6" (152mm) in front of the rudder hinge line.



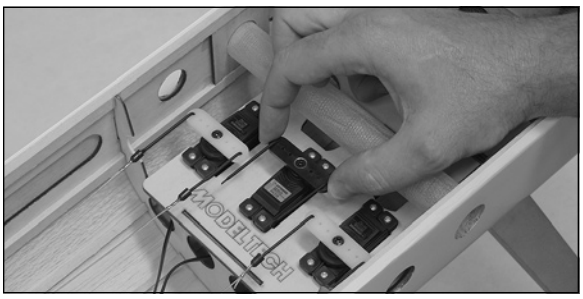
❑ Temporarily thread one M2 hex nut and one 2mm clevis onto each of the two threaded couplers, then feed the plain end of each of the two lengths of stranded cable through the slots in the fuselage and into the servo compartment.

❑ Snap each clevis into the hole in the adjustable control horns, then firmly tighten the two hex nuts up against the clevises to lock the threaded coupler into place.



❑ Enlarge the hole in each side of a servo horn that is 3/4" (19mm) out from the centre of the servo horn, using a 5/64" (2mm) diameter drill bit.

❑ Install one Z-Bend coupler into the hole in each side of the servo horn that you enlarged.



❑ Centre the rudder servo, then install the servo horn onto the servo, making sure that it's centred.

❑ Install the servo horn retaining screw to secure the servo horn to the servo.

❑ Use a couple of pieces of masking tape, taped between the rudder and the stabiliser, to hold the rudder centred.

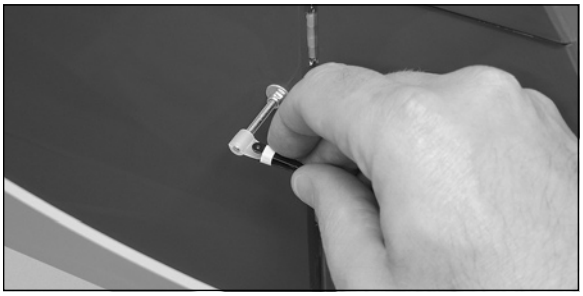
❑ Attach the stranded cable from the **right side** of the rudder to the Z-Bend coupler on the **right side** of the servo horn, then attach the stranded cable from the **left side** of the rudder to the Z-Bend coupler on the **left side** of the servo horn. Use the same techniques that you used to attach the stranded cable to the threaded couplers.

IMPORTANT Make sure that both lengths of stranded cable are pulled tight. There should not be any slack in either of the stranded cables.

❑ Remove the masking tape from the rudder and double-check that both servo horn and the rudder are still centred. If the rudder is not centred, readjust the clevises until it is.

❑ Move the rudder right and left several times to ensure that the control linkage does not bind. It should operate smoothly in both directions.

❑ Check the tension of the stranded cables. To do this do the following: move the rudder control stick to the left. Let the control stick go and check to see if the rudder returns to centre. Do this a couple of times in each direction. If the rudder does not come back to centre, one or both stranded cables are too tight. You can adjust the tension of the stranded cables by adjusting the clevises. Ideally, the stranded cables should be as tight as possible, while still allowing the rudder to return to centre. The stranded cables should not have slack in them, yet they should not be so tight that the linkage and/or the servo bind.



❑ Once you are satisfied with the alignment and setup, cut two 1/8" (3mm) long pieces of heat-shrink tubing and slide one piece over each clevis. The heat-shrink tubing will ensure that the clevises do not open up during flight.

AILERON CONTROL SYSTEM INSTALLATION

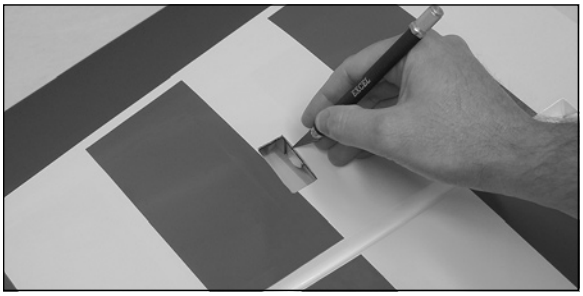
YOU'LL NEED THE FOLLOWING PARTS FROM THE KIT:

- ❑ (2) 2-3/8" (60mm) Threaded Pushrod Wires
- ❑ (2) M3 x 50mm Machine Screws
- ❑ (2) Nylon Adjustable Control Horns
- ❑ (4) Metal Clevises - 3mm Thread
- ❑ (4) M3 Flat Washers
- ❑ (2) M3 Lock Nuts
- ❑ (4) M3 Hex Nuts
- ❑ (1) Heat-Shrink Tubing

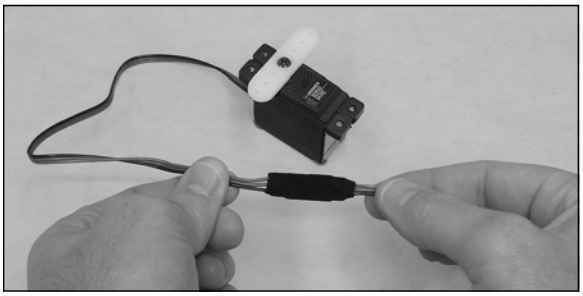
YOU'LL NEED THE FOLLOWING TOOLS AND SUPPLIES:

- ❑ # 1 and # 2 Phillips Head Screwdrivers
- ❑ Adjustable Wrench
- ❑ Modeling Knife
- ❑ Electric Drill
- ❑ 1/16" (1.6mm) Drill Bit
- ❑ Straight Edge Ruler
- ❑ Pencil
- ❑ Masking Tape
- ❑ Heat Gun

STEP 1: INSTALLING THE ELEVATOR SERVOS

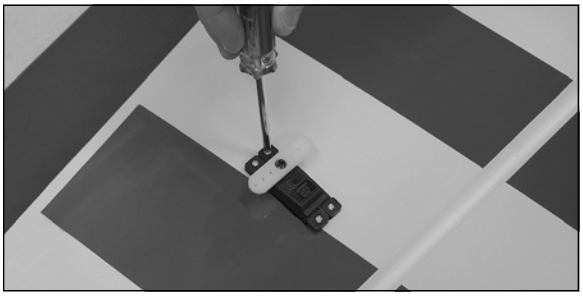


❑ Cut away the covering material from over the aileron servo mounting hole in one wing panel. The servo mounting hole is located 10-1/4" (260mm) out from the root edge of the wing panel and 2-3/4" (70mm) in front of the aileron hinge line.



❑ Plug one 12" (305mm) servo extension onto the aileron servo lead.

❑ To prevent the plugs from pulling apart during assembly, or worse, during flight, secure the plugs together, using a short piece of 3/8" (10mm) diameter heat-shrink tubing (not included). Use a heat gun to shrink the tubing.



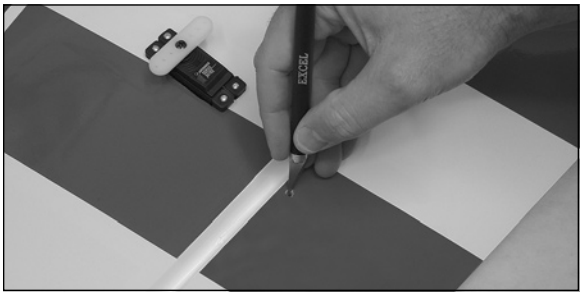
❑ Run the aileron servo extension lead through the guide tube in the aileron servo mounting hole and out through the root end of the wing panel.

❑ Install the aileron servo into the mounting hole, making sure to drill 1/16" (1.6mm) diameter pilot holes for the servo mounting screws.

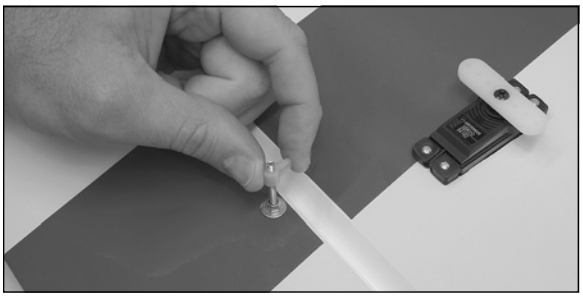
IMPORTANT Note the orientation of the servo. When installed, the servo output shaft should be toward the leading edge of the wing panel.

❑ Repeat the previous procedures to install the second aileron servo into the other wing panel.

STEP 2: INSTALLING THE AILERON CONTROL HORNS



❑ Cut away the covering material from over the top and the bottom of the aileron control horn mounting hole in one aileron. The control horn mounting hole is located 8-11/16" (221mm) out from the inside edge of the aileron and 3/8" (10mm) back from the leading edge of the aileron.

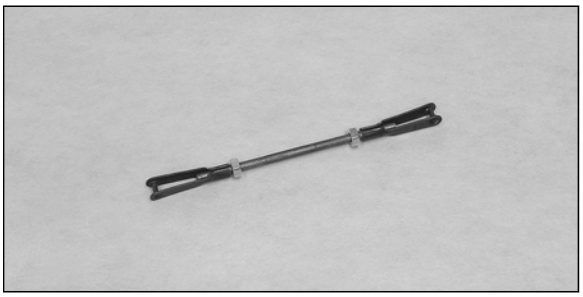


❑ Slide one M3 flat washer onto one M3 x 50mm machine screw, then push the machine screw up through the control horn mounting hole. Slide a second M3 flat washer onto the machine screw, then thread one M3 lock nut onto the machine screw and tighten it firmly.

❑ Thread one nylon adjustable control horn onto the machine screw until the top of the control horn is 1/8" (3mm) below the end of the machine screw, then repeat the previous procedures to install the aileron control horn onto the other aileron.

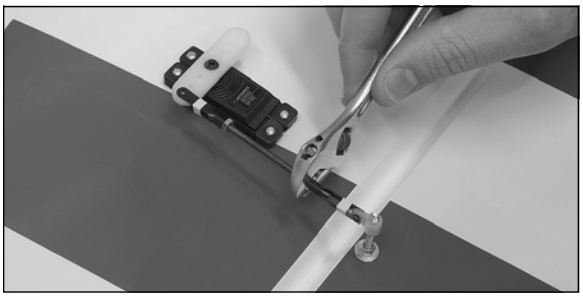
STEP 3: INSTALLING THE AILERON CONTROL LINKAGES

❑ Use a couple of pieces of masking tape, taped between one aileron and the wing panel, to hold the aileron centred.



❑ Temporarily thread one M3 hex nut and one 3mm clevis onto each end of one 2-3/8" (60mm) threaded pushrod wire.

❑ Centre the aileron servo and install a servo horn onto the servo, making sure that the servo arm is centred and points toward the wing tip. Install the servo horn retaining screw to secure the servo horn to the servo.



❑ Snap the clevis on one end of the threaded pushrod wire into the hole in the servo arm that is 3/4" (19mm) out from the centre of the servo horn.

❑ Adjust the length of the pushrod by adjusting the two clevises, then snap the second clevis into the hole in the adjustable control horn.

❑ With both the aileron and the servo horn centred, firmly tighten the two hex nuts up against the clevises to lock the pushrod wire into place.

❑ Repeat the previous procedures to assemble and install the second aileron control linkage. Remove the masking tape from the ailerons and double-check that both servo horns and both ailerons are still centred. If the ailerons are not centred, readjust the clevises until they are, then move the ailerons up and down several times to ensure that the control linkages do not bind. They should operate smoothly in both directions.

❑ Once you are satisfied with the alignment and setup, cut four 1/8" (3mm) long pieces of heat-shrink tubing and slide one piece over each clevis (see photo above). The heat-shrink tubing will ensure that the clevises do not open up during flight.

COWL INSTALLATION

YOU'LL NEED THE FOLLOWING PARTS FROM THE KIT:

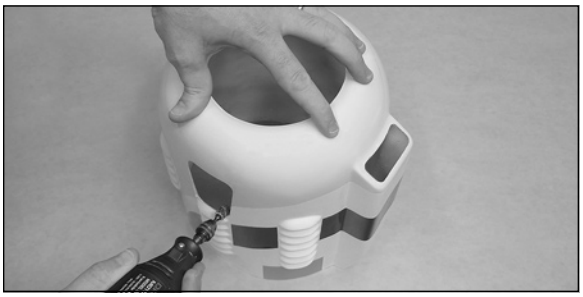
- ❑ (1) Fiberglass Cowl
- ❑ (2) Clear Mock-Up Cowl Halves
- ❑ (5) M3 x 10mm Machine Screws
- ❑ (5) M3 Flat Washers

YOU'LL NEED THE FOLLOWING TOOLS AND SUPPLIES:

- ❑ # 2 Phillips Head Screwdriver
- ❑ Adjustable Wrench
- ❑ Scissors
- ❑ Electric Drill
- ❑ 1/8" (3mm) Drill Bit
- ❑ Straight Edge Ruler
- ❑ Pencil
- ❑ Builder's Triangle
- ❑ Rotary Tool with Cutting Disc and Sanding Drum
- ❑ 220 Grit Sandpaper
- ❑ Sanding Block
- ❑ Masking Tape
- ❑ Airplane Stand

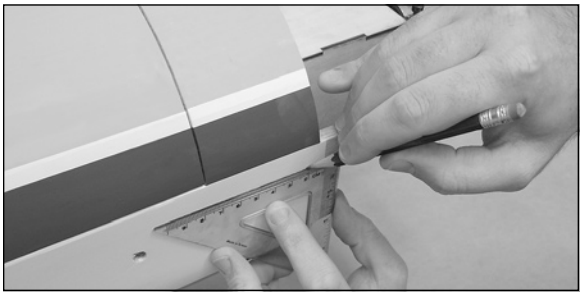
STEP 1: ALIGNING THE COWL

PRO TIP The Yak 54 ARF includes a clear mock-up cowl that can be used to make it easier to locate the necessary cutouts for your engine and muffler prior to actually cutting the fiberglass cowl. This is great for locating and transferring the initial cutouts to the fiberglass cowl; however, we suggest locating the holes for the cowl mounting screws using the method described in this section. This method will be more accurate than using the mock-up cowl.



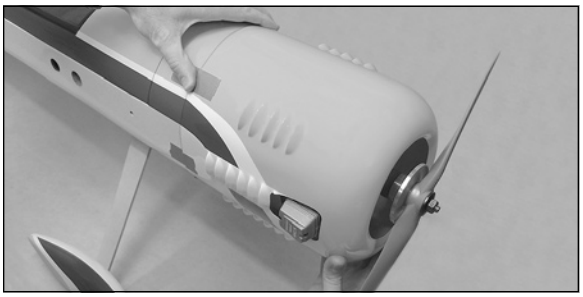
❑ Measure and mark the locations on the cowl that you must cut out to clear your engine's cylinder head and muffler.

❑ Carefully cut out the cowl for your engine's cylinder head and muffler, then cut out the front of the air-intake scoop on the bottom of the cowl. Work slowly, removing small amounts of material at a time, and checking the fit often.



❑ Draw a short line onto the fuselage that is perpendicular to the front of the fuselage and lined up with the centre of the predrilled hole in each cowl mounting block. Each of the five lines should be approximately 1" (25mm) long to ensure that each of the five lines extend past where the back edge of the cowl will be once it's installed.

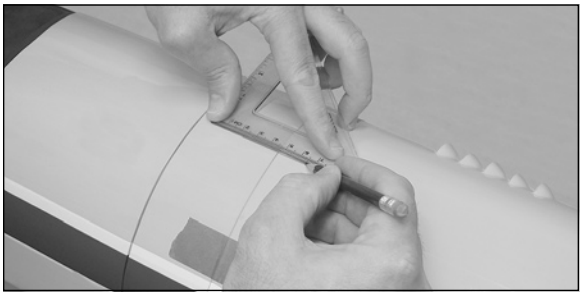
❑ Temporarily slide the cowl onto the fuselage, then install your spinner backplate and propeller.



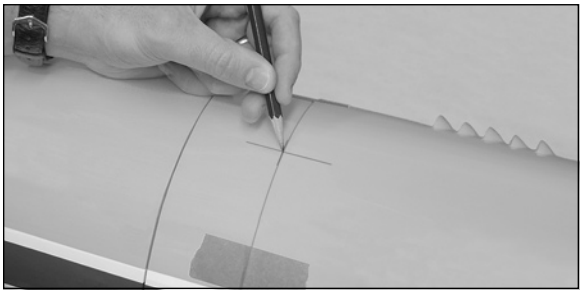
❑ Line up the front of the cowl, using the spinner backplate and the propeller as a guide. When aligned properly, the cowl opening should be centred around the spinner backplate and the front of the cowl should be 1/2" (13mm) behind the back edge of the propeller. The painted lines on the cowl should line up with the matching lines on the fuselage, too.

❑ When satisfied with the alignment, use pieces of masking tape to hold the cowl securely to the fuselage.

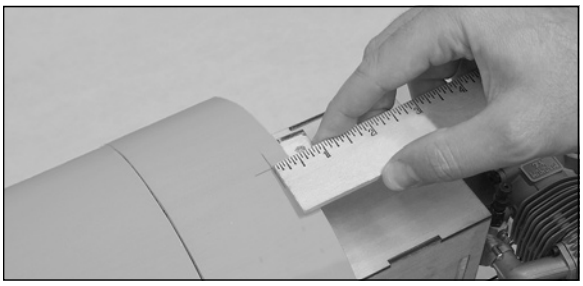
STEP 2: INSTALLING THE COWL



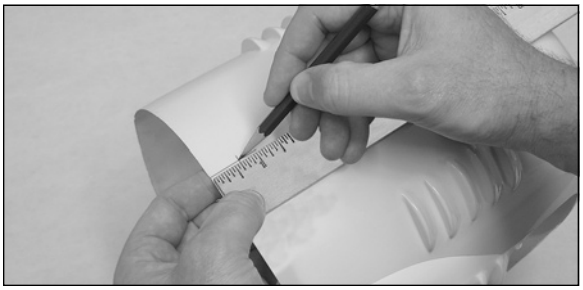
❑ Extend each of the five lines that you previously drew onto the fuselage forward onto the cowl. Like with previous five lines, draw these five lines approximately 1" (25mm) long.



❑ Draw a short line onto the fuselage that cross each of the five lines that you drew onto the fuselage previously, to mark the back edge of the cowl.



❑ Remove the cowl from the fuselage, then measure forward from each of the lines that you drew to mark the back edge of the cowl to the centre of the predrilled hole in each of the cowl mounting blocks. Make a note of these measurements for the next procedure.

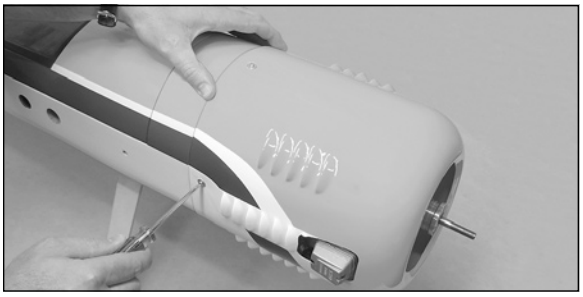


❑ Measure the resulting distances forward from the back edge of the cowl and draw intersecting lines onto the cowl over the lines that you extended onto the cowl previously.

❑ Carefully drill 1/8" (3mm) diameter holes through the cowl at each of the five intersecting lines.

❑ Mark and cut out the areas of the cowl necessary to give you access to your engine's high and low speed needle valves, glow plug and choke lever (if featured). You should also install a fuel valve into a convenient location on the bottom or side of the cowl.

☞ Many engines will require the use of a needle valve extension to access the high speed needle valve. We suggest making one from scrap 1.5mm diameter wire of sufficient length for easy access outside of the cowl.



❑ Connect the fuel lines from the fuel tank to your engine's carburetor, muffler and fuel valve, then slide the cowl into position and realign it.

❑ Install the cowl onto the fuselage, using five M3 x 10mm machine screws and five M3 flat washers, then install your propeller and spinner.

FLYING WIRES INSTALLATION

YOU'LL NEED THE FOLLOWING PARTS FROM THE KIT:

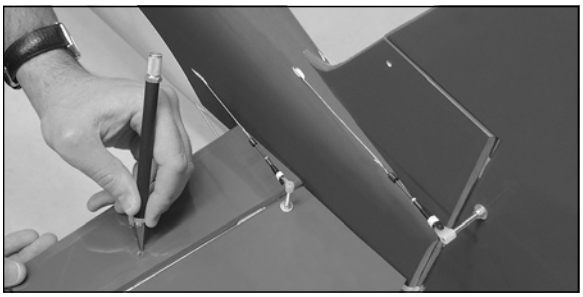
- ❑ (1) Stranded Cable
- ❑ (7) Aluminium Brackets
- ❑ (8) Metal Eyelets
- ❑ (3) M3 x 25mm Machine Screws
- ❑ (8) M3 x 10mm Machine Screws
- ❑ (1) M3 x 12mm Wood Screw
- ❑ (11) M3 Lock Nuts
- ❑ (23) M3 Flat Washers

YOU'LL NEED THE FOLLOWING TOOLS AND SUPPLIES:

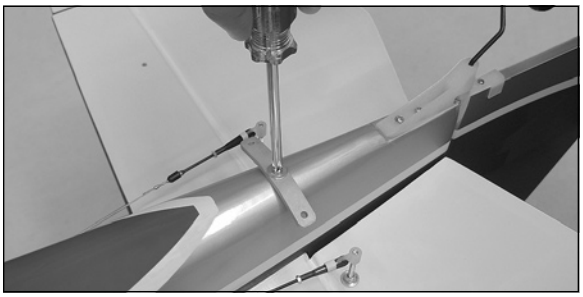
- ❑ Thin C/A
- ❑ # 2 Phillips Head Screwdriver
- ❑ Wire Cutters
- ❑ Adjustable Wrench
- ❑ Needle Nose Pliers
- ❑ Modeling Knife
- ❑ Electric Drill
- ❑ 5/64" (2mm) Drill Bit
- ❑ Straight Edge Ruler
- ❑ Pencil
- ❑ Airplane Stand

STEP 1: INSTALLING THE MOUNTING BRACKETS

IMPORTANT Three different styles of mounting brackets are included. The mounting bracket with three holes in it is installed on the bottom of the fuselage. The two mounting brackets that are bent at a shallow angle are installed on the bottom of the horizontal stabiliser and the four mounting brackets that are bent at a steeper angle are installed on the top of the horizontal stabiliser and the sides of the vertical stabiliser.

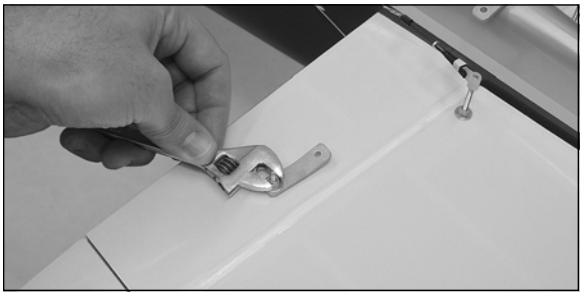


❑ Cut away the covering material from over both sides of the three flying wire bracket mounting holes in the horizontal and vertical stabilisers. One mounting hole is located in the vertical stabiliser, 5/8" (16mm) down from the top of the stabiliser and 3-1/8" (80mm) in front of the rudder hinge line. One mounting hole is located in each side of the horizontal stabiliser, 3-3/8" (86mm) in from the end of the stabiliser and 3/4" (19mm) in front of the elevator hinge line.



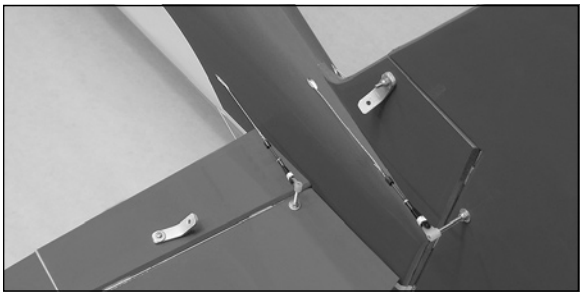
❑ Install the lower mounting bracket onto the bottom of the fuselage, using one M3 x 12mm wood screw and one M3 flat washer. The centre of the mounting bracket should be positioned over the middle of the fuselage, 2-3/8" (60mm) in front of the tail wheel mounting platform.

IMPORTANT Make sure to drill a 5/64" (2mm) diameter pilot hole for the mounting screw.



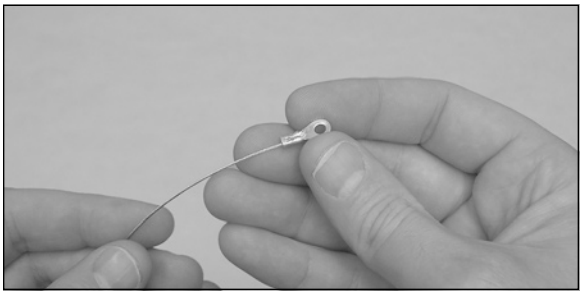
❑ Install mounting brackets onto each side of the top and the bottom of the horizontal stabiliser, using two M3 x 25mm machine screws, four M3 flat washers and two M3 lock nuts. Don't tighten the lock nuts completely at this time. Leave them slightly loose.

IMPORTANT Remember, the two mounting brackets that are bent at a shallower angle are installed on the bottom of the horizontal stabiliser.

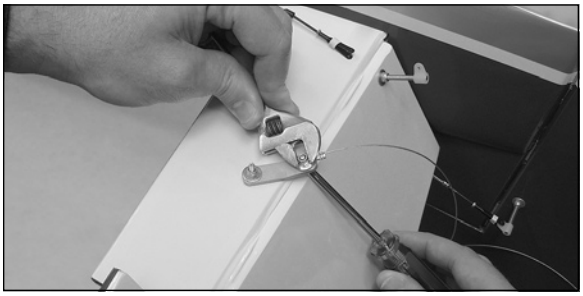


❑ Install the remaining two mounting brackets onto each side of the vertical stabiliser, using one M3 x 25mm machine screw, two M3 flat washers and one M3 lock nut. Don't tighten the lock nut completely at this time. Leave it slightly loose.

STEP 2: INSTALLING THE FLYING WIRES



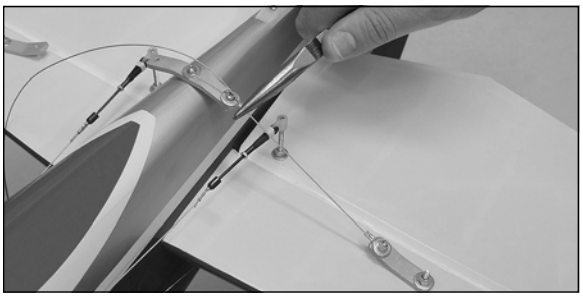
❑ Slide one metal eyelet onto one end of the stranded cable, then firmly crimp the metal eyelet, using a pair of pliers, to lock the stranded cable into place.



❑ Install the metal eyelet onto the mounting bracket on the bottom of one side of the stabiliser, using one M3 x 10mm machine screw, two M3 flat washers and one M3 lock nut.

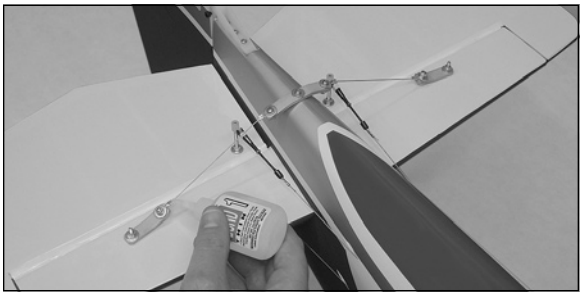
IMPORTANT Install the machine screw from the bottom of the mounting bracket. You will need to deflect the elevator half up and pivot the mounting bracket over the hinge line to install and tighten the machine screw.

IMPORTANT When installing the metal eyelet onto the mounting bracket that's installed onto the fuselage in the procedure below, you will need to install the machine screw from the top of the mounting bracket.



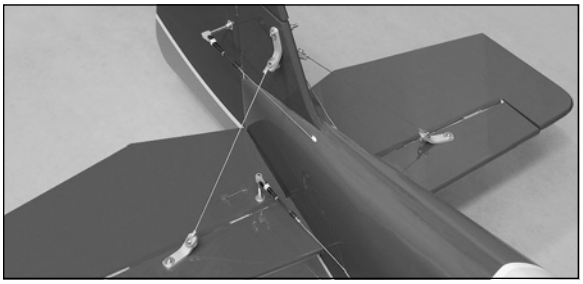
❑ Install one metal eyelet onto the mounting bracket that's installed on the fuselage, using one M3 x 10mm machine screw, two M3 flat washers and one M3 lock nut.

❑ Feed the end of the stranded cable though the metal eyelet, then pull the stranded cable taught and firmly crimp the metal eyelet to lock the stranded cable into place. Cut the stranded cable off flush with the metal eyelet.



❑ Repeat the previous procedures to install the flying wire between the bottom of the horizontal stabiliser and the fuselage.

❑ Apply a couple of drops of thin C/A to the four metal eyelets. The C/A will 'wick' between the metal eyelets and the stranded cables, making the joints even stronger.



❑ Repeat the previous procedures to install the flying wires between the top of the horizontal stabiliser and the sides of the vertical stabiliser.

❑ Tighten each of the machine screws and lock nuts to secure the mounting brackets firmly into place.

FINAL ASSEMBLY

YOU'LL NEED THE FOLLOWING PARTS FROM THE KIT:

- ❑ (1) Tinted Canopy
- ❑ (2) M3 x 16mm Machine Screws
- ❑ (2) M3 Flat Washers
- ❑ (9) M2 x 10mm Flange-Head Wood Screws

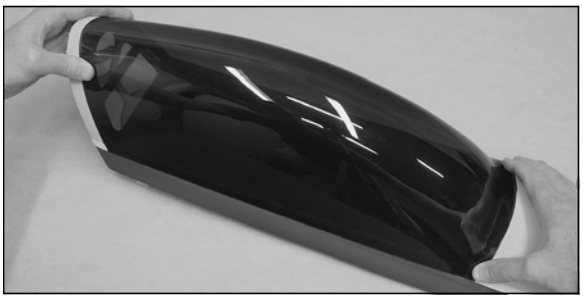
YOU'LL NEED THE FOLLOWING TOOLS AND SUPPLIES:

- ❑ Formula 560 Canopy Glue
- ❑ # 1 Phillips Head Screwdriver
- ❑ Adjustable Wrench
- ❑ Scissors
- ❑ Electric Drill
- ❑ 1/16" (1.6mm) and 5/64" (2mm) Drill Bits
- ❑ Straight Edge Ruler
- ❑ Pencil
- ❑ 220 Grit Sandpaper
- ❑ Sanding Block
- ❑ Masking Tape
- ❑ Paper Towels

STEP 1: INSTALLING THE CANOPY

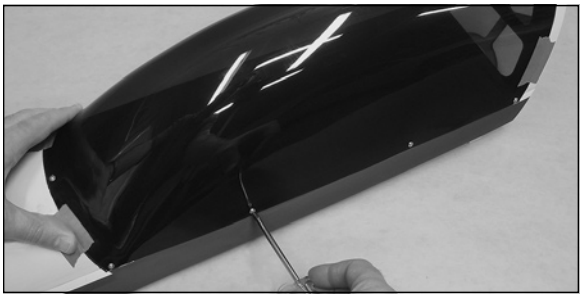
❑ Cut out the canopy along the moulded scribe line.

❑ Carefully sand the edges of the canopy smooth and straight, being careful not to scratch the sides of the canopy.



❑ Set the canopy onto the cockpit deck and align it. When aligned properly, the edges of the canopy should fit into the recess around the perimeter of the cockpit deck. It may be necessary to trim the edges of the canopy slightly for a perfect fit.

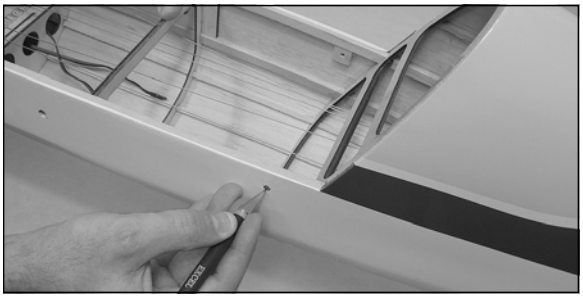
❑ When satisfied with the alignment, use pieces of masking tape to hold the canopy firmly in place.



❑ Secure the canopy to the cockpit deck, using a thin layer of Formula 560 Canopy Glue and nine M2 x 10mm flange-head wood screws. Four wood screws should be installed along the bottom edge of each side of the canopy and one wood screw should be installed centred at the front of the canopy.

IMPORTANT Drill 1/16" (1.6mm) pilot holes through **only** the canopy for the wood screws.

STEP 2: INSTALLING THE COCKPIT DECK



❑ Cut away the covering material from over the cockpit deck mounting holes in the fuselage. One mounting hole is located in each side of the fuselage, 5/8" (16mm) down from the top of the fuselage side and 1-3/8" (35mm) in front of the back of the cockpit opening.

❑ Set the cockpit deck onto the fuselage and secure it into place, using two M3 x 16mm machine screws and two M3 flat washers.

IMPORTANT You may need to enlarge the holes in the fuselage sides slightly to allow easier alignment of the machine screws with the blind nuts in the cockpit deck.

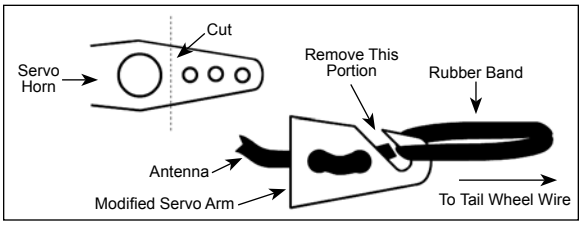
STEP 3: INSTALLING YOUR RECEIVER, BATTERY, AND SWITCH HARNESS

❑ Wrap your receiver and battery in foam rubber to protect them from vibration. Use rubber bands to hold the foam rubber in place.

☞ Do not wrap the foam rubber too tightly or the vibration dampening quality will be reduced.

IMPORTANT We don't suggest permanently installing the receiver and battery until you have balanced the aircraft. How the aircraft initially balances will determine where you need to install them.

❑ After you've found the final location of the receiver and battery, install them into the fuselage using your favorite method.



❑ Run the antenna wire out the bottom of the fuselage and secure it to the tail wheel wire using a rubber band and an antenna mount made from an extra servo horn.

IMPORTANT If you're using a 2.4GHz radio control system, refer to your radio control system's User's Guide for information on antenna placement.

❑ Mount the switch to the fuselage side and connect the battery lead to the switch, and the switch and servo leads to the receiver.

C/G AND BALANCING

IMPORTANT It is critical that your aircraft be balanced correctly. Incorrectly balancing your aircraft can cause your aircraft to lose control and crash!

BALANCE POINT (C/G):

- **5-1/2" (140MM) BACK FROM THE LEADING EDGE OF THE WING, MEASURED AT THE FUSELAGE SIDES.**

❑ Turn the aircraft upside down, place your fingers on the wing at the balance point, then carefully lift the aircraft. If the nose of the aircraft drops, the aircraft is nose heavy. To correct this, move the battery and/or receiver back far enough to bring the aircraft into balance. If the tail of the aircraft drops, the aircraft is tail heavy. To correct this, move the battery and/or receiver forward far enough to bring the aircraft into balance. **When balanced correctly, the aircraft should sit level or slightly nose down when you lift it up with your fingers at the C/G location.**

IMPORTANT Balance the aircraft with the fuel tank **empty.**

☞ Once you have flown and become familiar with the flight characteristics of the aircraft, the C/G can be moved fore or aft up to 1/2" (13mm) in either direction to change the flight performance. Moving the C/G back will cause the aircraft to be more responsive, but less stable. Moving the C/G forward will cause the aircraft to be more stable, but less responsive.

YOU CAN MOVE THE C/G BACK IN SMALL INCREMENTS UNTIL YOU ARE SATISFIED WITH THE FLIGHT CHARACTERISTICS, HOWEVER, MOVING THE C/G TOO FAR BACK COULD RESULT IN LOSS OF CONTROL.

LATERAL BALANCING

Lateral balancing will make the aircraft track straighter in the air and make it easier to trim the control surfaces for optimum flight performance. It is strongly recommended.

❑ Turn the aircraft **upside down** and tie one length of heavy string to the propeller shaft and loop a second length of heavy string around the tail wheel.

❑ With someone helping you, carefully lift the aircraft up by the two pieces of heavy string. Watch how the wing reacts. If one side of the wing drops, that side is heavier than the other. To correct this, stick a small piece of self-adhesive lead weight to the bottom of the lighter side of the wing (the one that doesn't drop). For best mechanical advantage, place the weight as close to the wing tip as possible, but make sure to apply the lead weight to a solid portion of the wing structure so that it can't rip off during flight.

❑ Repeat the procedure a couple of more times to double-check your findings. When done properly the wing should stay level when you lift the aircraft.

CONTROL THROWS

We recommend initially setting up the aircraft using the Test Flying control throws. These control throws are suggested for initial test flying because they will allow the aircraft to fly smoother and make it easier to control. For sport flying and aerobatics, increase the control throws by 1/8" (3mm) at a time until you're satisfied with the result, but only AFTER you've become familiar with the flight characteristics of the aircraft using the Test Flying control throws.

TEST FLYING		3D FLYING	
Ailerons:	**3/4" (19mm) Up / Down**	**Ailerons:**	**45º Up / Down**
Elevator:	**3/4" (19mm) Up / Down**	**Elevator:**	**80º Up / Down**
Rudder:	**1" (25mm) Right / Left**	**Rudder:**	**60º Right / Left**

THE CONTROL THROWS ARE MEASURED FROM THE WIDEST POINT OF THE CONTROL SURFACES.

DON'T FORGET TO INSTALL THE PIECES OF HEAT-SHRINK TUBING OVER THE CLEVISES AS DESCRIBED IN THE CONTROL SYSTEMS INSTALLATION SECTIONS.

IMPORTANT As you increase the control throws, the aircraft will become more sensitive and react much more quickly to control inputs. We do not suggest increasing the control throws unless you are a proficient flyer. We also recommend using Exponential as described on the next page. Higher control throws will cause the airplane to be extremely control sensitive and result in a possible crash if you are not careful.

AIRCRAFT SETUP INFORMATION

EXPONENTIAL

Exponential (Expo) softens the control feel around neutral. This is especially helpful when flying an aircraft that uses a lot of control throw. Softening the neutral point makes the aircraft fly more smoothly and makes it more likely that you won't over-control. Please note that different brands of radio control systems may call for + or - Expo. Please refer to your radio control system's User's Guide for more information.

Obviously, you may want to change the expo settings to suit your flying style, but here are our suggestions to start:

TEST FLYING		3D FLYING	
Ailerons	**10%**	**Ailerons**	**65%**
Elevator	**10%**	**Elevator**	**65%**
Rudder	**10%**	**Rudder**	**65%**

CONTROL SURFACE LINKAGES

If you don't maintain the proper mechanical advantage on the control surfaces, control surface flutter may result, which can cause your aircraft to lose control and crash. Mechanical advantage refers to the distance that the pushrod attachment points (pivot points) are from the servos and the control surfaces.

- Keeping the pushrods as close to the centre of the servo arms as possible will increase the servo's resolution. What this means is that when you move the control sticks on the transmitter, the servo arms will have to travel farther to achieve the desired amount of control input. This makes the resolution higher, therefore causing the control surface deflection to be more precise. We don't recommend moving the pushrods any farther away from the center of the servo arms than absolutely necessary.

- Keeping the pushrods as far away as possible from the control surfaces is better than moving them closer. The mechanical advantage is greatly reduced the closer the pushrods are moved toward the control surfaces. The closer the pushrod is attached to the control surface, the more chance of inducing flutter. We don't recommend moving the pushrods any closer to the control surfaces than absolutely necessary.

THROTTLE MANAGEMENT

It is very important that you understand throttle management. Basically, this means no full throttle dives. Full throttle dives should be avoided so as not to cause control surface flutter and/or airframe failure. When the nose of the aircraft drops, decrease the throttle, just as in full-scale aerobatics.

SEALING THE HINGE GAPS

Sealing the hinge gaps on both the ailerons and the elevator halves is important for a couple of reasons. First, sealing the hinge gaps improves the responsiveness of the control surfaces. Second, and more importantly, sealing the hinge gaps smooths airflow over the hinge lines, helping to reduce the chance of control surface flutter, which can result in loss of control and/or failure of the airframe.

You should ensure that you follow the steps in the control surface hinges sections to seal the hinge gaps on both the ailerons and the elevator halves. Only the bottom of the hinge gaps need to be sealed and it's not necessary to seal the rudder hinge gap.

CONTROL LINKAGE CLEVISES

Steel clevises are used for durability, however, because metal clevises are threaded onto metal pushrods and couplers, it's important than you firmly tighten the hex nuts (retaining nuts) to lock the couplers, pushrods, and clevises securely into place. If you don't, vibration can cause the threads to wear and eventually fail, resulting in loss of control. It's important to periodically check the hex nuts to ensure that they haven't loosened.

Heat-shrink tubing is provided to keep the clevises from accidentally opening up during flight. It's important the you install pieces. If you don't, it's possible for a clevis to come apart, resulting in loss of control.

FLYING WIRES

Periodically check the flying wires to ensure that all of the flying wires are still tight. The flying wires help with structural stability of the tail section, particularly during violent manuevres.

PREFLIGHT CHECK AND SAFETY

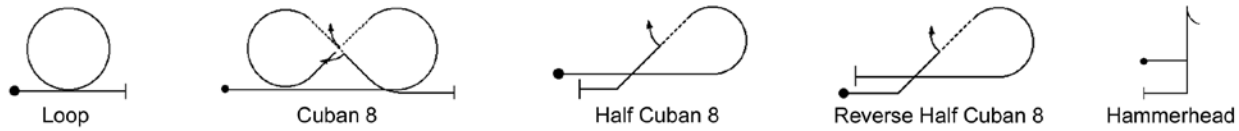
- Completely charge the transmitter and receiver batteries before your first day of flying.
- Check every bolt and every glue joint in the aircraft to ensure that everything is tight and well-bonded. This should include all of the control surface hinges as well.
- Double-check that you've installed and tightened all of the servo horn retaining screws.
- Use thread locking compound on all fasteners that thread into metal to prevent vibration from loosening them.
- Double-check that the receiver and battery are properly secured into the fuselage. There's nothing worse than the battery pack coming loose during flight.
- Double-check that the fuel tank is properly secured into the fuselage.
- Double-check the balance of the aircraft. Do this with the fuel tank empty.
- Check the control surfaces. They should all move in the correct direction and not bind.
- Make sure that you've installed heat-shrink tubing over the clevises to prevent any chance of them opening during flight.
- When installing the wing panels, double-check that the retaining clips are fully seated.
- Make sure that you've sealed the aileron and elevator hinge gaps. Not sealing the aileron and elevator hinge gaps can lead to control surface flutter.
- Double-check that the hex nuts (retaining nuts) are tightened against the clevises.
- If your radio transmitter is equipped with dual rate switches, double-check that they are on the low-rate setting for your first few flights.
- Check to ensure that all of the control surfaces are moving the proper amount in both low and high rate settings.
- Check the receiver antenna. It should be fully extended and not coiled up inside the fuselage. Do not cut the receiver antenna shorter or the range of your radio control system will be greatly reduced.
- If you're using a 2.4GHz radio control system, refer to your radio control system's User's Guide for information on correct antenna placement.
- Properly balance the propeller. A propeller that is out of balance will cause excessive vibration, which could lead to engine and/or airframe failure, and it will reduce engine efficiency and power.
- Double-check that the propeller nut(s) is/are tightened securely and that the spinner cone retaining screws are tight.
- Double-check that no part of the spinner touches the propeller. You may need to enlarge the spinner cutouts to fit.

The following are our general guidelines for your safety and the safety of others. Please read and understand these safety guidelines before going out to the flying field for the first time.

- Do not test-fly your model for the first time without first having it safety-checked by an experienced modeler.
- Do not fly your model higher than approximately 400 feet within 3 miles of an airport without having an observer with you. The observer should tell you about any full-size aircraft in your vicinity and you should always give the right-of-way to full-scale aircraft.
- When flying at a flying field with established rules, you should abide by those rules. You should not deliberately fly your model in a reckless and/or dangerous manner.
- While flying, you should not deliberately fly behind the flight line. If your model should inadvertently fly behind the flight line, you should change course immediately.
- You should complete a successful range check of your radio equipment prior to each new day of flying, or prior to the first flight of a new or repaired model.
- You should perform your initial turn after take- off away from the flight line and/or spectator area.
- You should not knowingly operate your R/C radio system within 3 miles of a preexisting model club flying field without a frequency sharing agreement with that club.

TRIM CHART

After you have test-flown and done the initial trim changes to the aircraft, use this trim chart to begin trimming your aircraft. Following and adhering to this chart will result in the ability to diagnose trim problems and correct those problems using the simple adjustments shown below. Making these observations and related corrections will result in an aircraft that tracks straighter and flies truer.



TRIM FEATURE	MANEUVER	OBSERVATION	CORRECTION
Control Centreing	Fly general circles and random maneuvres	Try for hands off straight and level flight	Readjust linkages so the transmitter trim levers are centered
Control Throws	Fly random maneuvres	A) Controls are too sensitive or aircraft feels 'jerky' B) Controls are not sensitive enough or aircraft feels 'mushy'	If A) Adjust linkages to reduce control throws or use exponential If B) Adjust linkages to increase control throws
Engine Thrust Angle*	From straight and level flight, quickly chop the throttle for a short distance	A) Aircraft continues in a level attitude for a short distance B) Aircraft pitches nose up C) Aircraft pitches nose down	If A) Engine thrust angle is correct If B) Decrease engine down thrust If C) Increase engine down thrust
Centre of Gravity	From level flight, roll to a 45º bank and neutralise the controls	A) Aircraft continues in the bank for a short distance B) Nose pitches up C) Nose pitches down	If A) Center of gravity is correct If B) Add nose weight If C) Remove nose weight or add tail weight
Yaw**	Into the wind, perform inside loops using only elevator. Repeat test performing outside loops from an inverted entry	A) Wing is level throughout B) Aircraft yaws to right in both inside and outside loops C) Aircraft yaws to left in both inside and outside loops D) Aircraft yaws to the right in inside loops and yaws to the left in outside loops E) Aircraft yaws to the left in inside loops and yaws to the right in outside loops	If A) Trim settings are correct If B) Add left rudder trim If C) Add right rudder trim If D) Add left aileron trim If E) Add right aileron trim
Lateral Balance**	Into the wind, perform tight inside loops using only elevator	A) Wing is level and aircraft falls to either side B) Aircraft falls off to the left. Worsens as loops tighten C) Aircraft falls off to the right. Worsens as loops tighten	If A) Lateral balance is correct If B) Add weight to right wing tip If C) Add weight to left wing tip
Aileron Control System	With the wing level, pull to a vertical climb and neutralise the controls	A) Climb continues along the same path B) Nose tends to go toward an inside loop C) Nose tends to go toward an outside loop	If A) Trim settings are correct If B) Raise both ailerons very slightly If C) Lower both ailerons very slightly

*Engine thrust angle and center of gravity interact. Check both.

**Yaw and lateral balance produce similar symptoms. Note that the fin may be crooked. Make certain both elevator halves are even with each other and that they both produce the same amount of control deflection throughout the entire deflection range. Right and left references are as if you were sitting in the cockpit.

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PRODUCT EVALUATION SHEET

Telling us what you like and don't like determines what model kits we make and how we make them. We would appreciate it if you would take a few minutes of your time to answer the following questions about this kit and your modeling interests. Simply fold this form on the dotted lines, seal with tape and mail it to us. *Do not use staples and make sure our address faces out*.

Global Hobby Distributors will not disclose the information it collects to outside parties. Global Hobby Distributors does not sell, trade, or rent your personal information to others. Your privacy is important to us.

1) Kit: **Model Tech Yak 54 ARF # MT3173E**

2) Where did you learn about this kit?
- ❑ Magazine Ads
- ❑ Friend
- ❑ Hobby Shop
- ❑ Other
- ❑ Internet

3) What influenced you the most to buy this kit?
- ❑ Magazine Ads
- ❑ Price
- ❑ Type of Model
- ❑ Box Art
- ❑ Recommendation
- ❑ Other
- ❑ Internet

4) Did you have any trouble understanding the written instructions? If yes, please explain.
- ❑ Yes
- ❑ No

5) Did you have any trouble understanding any of the photographs? If yes, please explain.
- ❑ Yes
- ❑ No

6) Were any of the kit parts:
- ❑ Damaged
- ❑ Wrong Size
- ❑ Missing
- ❑ Wrong Shape

If you checked any of the boxes above, did you contact our Customer Service Department to resolve the problem?
- ❑ Yes
- ❑ No

7) Was any of the assembly difficult for you? If yes, please explain.
- ❑ Yes
- ❑ No

8) What did you like most about this kit?
- ❑ Assembly Manual
- ❑ Parts Fit
- ❑ Hardware Supplied
- ❑ Price
- ❑ Other

9) What did you like least about this kit?
- ❑ Assembly Manual
- ❑ Parts Fit
- ❑ Hardware Supplied
- ❑ Price
- ❑ Other

10) Are you satisfied with the finished model? If no, please explain.
- ❑ Yes
- ❑ No

11) How does this kit compare to similar kits by other manufacturers?
- ❑ Better
- ❑ As Good

QC #

What is Your Age Group:
❑ 10 & Under ❑ 11 - 20 ❑ 21 - 30 ❑ 31 - 40 ❑ 41 - 50 ❑ 51 - 60 ❑ 61 - 70 ❑ 71 +

How Many Years Have You Been in the Hobby?
❑ Less than 1 ❑ 2 - 4 ❑ 5 - 7 ❑ 8 - 10 ❑ 11 - 15 ❑ 16 - 20 ❑ 20 or More

How Many Models Have You Purchased In the Last Year?
❑ 0 - 1 ❑ 2 - 4 ❑ 5 - 7 ❑ 8 - 10 ❑ 10 or More

Please List any Other Modeling Interests or any Additional Information about This Product:

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